THE MEDICAL JOURNAL OF AUSTRALIA

VOL. I.—15TH YEAR. SYDNEY, SATURDAY, MARCH 24, 1928. No. 12.

Authors of articles submitted for publication are requested to read the following instructions and to comply with them.

All articles must be typed with double or treble spacing. Carbon copies should not be sent. Abbreviations should be avoided, especially those of a technical character at times employed in ward notes. Words and sentences should not be underlined or typed in capitals. The selection of the correct type is undertaken by the Editors. When illustrations are required, good photographic prints on glossy gaslight papers should be submitted. Each print should be enclosed in a sheet of paper. On this sheet of paper the number of the figure and the legend to appear below the print should be typed or legibly written. On no account should any mark be made on the back of the photographic print. If no good print is available, negatives may be submitted. Line drawings, graphs, charts and the like should be drawn on thick, white paper in India ink by a person accustomed to draw for reproduction. The drawings should be large and boldly executed and all figures, lettering and symbols should be of sufficient strength and size to remain clear after reduction. Skiagrams can be reproduced satisfactorily only if good prints or negatives are available. The reproduction of all illustrations but especially of skiagrams entails the sacrifice of time and energy and is expensive. Authors are expected to take a corresponding amount of trouble on the preparation of their illustrations, whether skiagrams, photographs, wash drawings or line drawings. The references to articles and books quoted must be accurate and should be compiled according to the following scheme. The order should correspond to the order of appearance in the article. The initials and surnames of the authors, the full title of the article or book, the full (unabbreviated) title of the journal in which the article appears, the date of the issue (day, month and year) and the number of the first page should be given in this sequence.

Table of Contents

[The Whole of the Literary Matter in THE MEDICAL JOURNAL OF AUSTRALIA is Copyright.]

ORIGINAL ARTICLES— PAGE.

"The George Adlington Syme Triennial Lecture," by F. D. BIRD, C.B., M.B., M.S., Honorary F.R.C.S. 356

"Generalized Infections Due to Pseudomonas Æruginosa (Bacillus Pyocyaneus), with a Study of the Characteristics of Local Strains of the Organism," by A. B. LILLEY, M.B., Ch.M., and A. J. BEARUP 362

"Hereditary Optic Atrophy," by G. H. HOGG, M.D. 372

REPORTS OF CASES—

"Hæmorrhagic Cholecystitis," by ST. JOHN W. DANSEY, M.B., Ch.M. 374

REVIEWS—

Surgery 374

LEADING ARTICLES—

Surgeons and their Outlook 375

CURRENT COMMENT—

The Causes of Still Birth 376
The Fat Content of the Thyreoid Gland 378
A Skin Test for Rheumatic Fever 379

ABSTRACTS FROM CURRENT MEDICAL LITERATURE—

Therapeutics 380
Neurology 380

SPECIAL ABSTRACT—

The Parathyreoid Glands 382

BRITISH MEDICAL ASSOCIATION NEWS— PAGE.

Medico-Political 385

POST-GRADUATE WORK—

Post-graduate Courses in Melbourne 385

CORRESPONDENCE—

Advertising 385
Pathological Service 386
The Introduction of Intratracheal Catheters 386
Liver Diet in Pernicious Anæmia 386

MEDICAL PRACTICE—

The Flying Doctor 387

OBITUARY—

Basil Carlyle Kennedy 387

UNDULANT OR MALTA FEVER 387

CHILDREN PATIENTS IN HOSPITAL 387

FOUND: THE SLIDING TOP OF AN OPERATING TABLE 387

BOOKS RECEIVED 388

DIARY FOR THE MONTH 388

MEDICAL APPOINTMENTS 388

MEDICAL APPOINTMENTS VACANT, ETC. 388

MEDICAL APPOINTMENTS: IMPORTANT NOTICE 388

EDITORIAL NOTICES 388

The George Adlington Syme Triennial Lecture.[1]

By F. D. BIRD, C.B., M.B., M.S. (Melbourne),
Honorary F.R.C.S. (England),
Honorary Consulting Surgeon, The Melbourne Hospital.

WHEN in one of his working bouts Hercules dragged Cerberus into the warm precincts of the cheerful day *ab inferos*, I have seen the place, the three-headed dog blinked his eyes and felt quite distrait at the unusual brightness around him; even as I do when after a retirement of five years I find myself in such a professional luminosity as emanates from this meeting of the Victorian Branch of the British Medical Association.

Alas, I have only one head instead of the three of Cerberus to approach so distinguished a gathering and to deliver what ought to be, if Sir George Syme had his rights, so distinguished a memorial lecture.

Admitting regretfully that three heads are better than one, I will try to thank you, as adequately as one head can, for the great honour done me in being selected to give the first Syme Memorial Lecture.

Sir George Syme, whom the whole profession fortunately knows, has been a good friend to each one of us.

In the inner circle of friendship to a few, the circumference of this circle from its very nature must be restricted, to many again his friendship has had no winter in it and to all the profession he has existed *in loco amici* by his splendid and enduring example.

He and I passed the great test of friendship, which is to share a friend, even more than one. I do not wear my heart upon my sleeve, but I would like to confide to you, that many, many have been the kindnesses, great and small and the good turns that I have received from George Syme in a friendship which has not worn thin in fifty years.

Naturally, I have tried to reciprocate, but his half century balance outweighs mine—our guest revealed his friendship for me (I knew it was there by instinct before) one day on Wilson's Promontory, when both young and well, with delightful company, the gods had given us lilies *plenis manibus*.

I was imprudently poising myself on the top of a large rock, not noticing how near I was to its edge and a fracture of the base of my skull. George did something very wisely which made me step forward, which doing, visual shafts of friendship assured me better than spoken words could have, of his most kindly affection.

As a gauge of my own exceeding regard, I may mention that returning from Gallipoli with a shipful of wounded, I heard in Alexandria that Colonel Syme was very ill. I found him barely past the corner, still terribly weak and seeming to have more relationship to the next world than to this. I was so near relation to my mother that I nearly disgraced the King's uniform by blubbering. It was very good news to me to hear later that he was really better. He appeared so diaphanous that one could almost see through him, the only occasion, I may say, on which I have had any success in this regard.

His hand had a poisoned wound.

The heat at the time was very great, the only obtainable surgery inept, the incisions too few and those there were would have been comic cuts if they had not been tragic.

He got this wound serving on board the hospital ship *Gascon*. The "O.C." was Colonel Hugo, who suffers from the same complaint as ourselves: he thinks the world of George Syme. Shepherds, we would not be cured. Would we?

Sir George's surgery is known to all. The whole profession and an exceedingly large majority of his patients can speak with personal acclamation of it. This is not always true of distinguished surgeons. One charm of his work and as long lived as that work, has been that he has existed in a very aura of honesty of purpose. It has always been a facet of *la vraie verité* which his mind has reflected. In a long life no one has ever doubted the truth to himself of his point of view. Truth in spite of the conjunction of noun and adjective in both Latin and English is very seldom naked, because of the relative nature of things she wears dresses suitable to such beings as humans in such a world as the present one.

The subject of this memorial has never dressed the lady in fancy dress, he has always preferred that she should be like a Puritan maiden in sober garments and adequate in very truth.

When to this worship for many years of the God of things as they are, is added an unusual keenness of intellect and an absolute sufficiency of judgement, you no longer wonder at the exalted position Sir George Syme holds in our profession and in our hearts.

Many I see tonight have been fortunate enough to be students of Sir George Syme. He was an ideal teacher, fitting the part as accurately as an expanding gas its container.

Of another characteristic it is difficult to speak because of its elusiveness. He has had a certain stabilizing influence in the profession. I cannot tell you the *modus operandi* thereof or whether he knows about it himself or even whether most of it is not in ourselves who have such confidence in him, but of its existence I have no doubt. A philosophical calmness in Sir George's mental make-up has been of the greatest value to him and to his work.

The old Romans worshipped *virtus*, which word covered "all that may become a man." The two main ingredients in this manly *virtus* were *firmitas* and *æquanimitas*. Sir George's character has these two Roman qualities in most sufficing salience.

As he is my contemporary I admit that he has reached years of discretion—he has had the will to

[1] Delivered at a meeting of the Victorian Branch of the British Medical Association on February 23, 1928.

live and the will to make live, the first requisite in the mental equipment of a surgeon. The chief attribute of the physician, I take it, is wisdom of the surgeon character. Sir George carries a heavy complement of both.

If I were to recount all Sir George's merits and virtues, all his services to the community, he might die of suffocation under an avalanche of words. We can spare him this adjectival death, because our President with ample generosity, in asking me to give this memorial lecture, told me, that when I had referred to the great services of Sir George Syme to the profession in his life's work, I was at liberty to talk about anything I liked in that chain of events which is the present proper way of alluding to the universe.

However much as I admire both Sir George Syme and the universe it is decidedly embarrassing for one's speech faculty to be left alone first with Sir George Syme who has a reticence born of his wisdom and then with the universe whose reticence is born of our ignorance.

I fear me I shall have to do all the talking which is not surgical, actions not sayings are the ἦθος of surgery, for the glory of the surgeon abideth not in words.

If I must talk, what better subject can I have than ourselves. We are part of the universe, though it has taken us æons of time to realize it and still some of us will take an outsider's point of view. Many of the mistakes of humanity have been due to this being extraneous. It is very natural to us.

Consider what centuries elapsed before the inhabitants of Milan and thereabouts informed themselves what great mountain to the north it was, that stood up and took the morning, and yet Monte Rosa is infinitely nearer to the dwellers in Lombardy than appears the rest of the universe to ourselves and there's no one like us. There being no layman present I hear no murmured "Thank Heaven!"

We are indeed a happy community. Plutarch says the first requisite of happiness is that a man should be born in a famous city. Most of us have had that good fortune and by an easy process of reasoning we can say that the city which witnessed the birth of any one of us is *ipso facto* famous.

But our real happiness lies in the fact that we perform our life's duties in the profession of medicine. It is indeed a gift of Fortune to be born into our calling. We invest our energies not in gold or merchandise, but in Life.

Our living, being always implicated in the life of humans, must make us humanists.

We are always aiding and abetting Life and as Life's values are always altering with each individual and with each period of time, whatever you make it, our humanism is always instinct with interest of a high human content.

Your lecturer who sees a ha'penny worth of future ahead of him, to an intolerable deal of past behind him, still finds a poignant interest in Life in all its mosaics around him and even in his own little *tesseræ* melting rapidly into the infinite azure of the past.

How can I prove to you that we are great and good (I know you feel it in your bones) as well as happy?

Examinations are out of fashion or ought to be, but there are other standards of a subtler satisfaction, to wit one, that of Voltaire who like ourselves, in constant contact with Life, always engaged in surveying much humanity, said: "Show me a man's enemies and I will tell you the manner of man he is."

We can judge ourselves by this criterion. In this world so many things are measured in price. Our profession, I take it, is measured in value. Alas much of humanity still thinks that price and value are interchangeable terms. Their sense of value is in terms of price. Who then are our enemies, that the world may judge what manner of men we are? Dirt, disease, deformity, foul smells, foul habits, foul surroundings, misuse of life generally and pain apart from its directional value. These are some of our enemies. Surely we should pass the Voltairean examination with honours!

To be in our profession is indeed glorious, but to serve in the operating part is very heaven. Possibly it is sense of power which at the other extremity of humanity impels a Lenin to deeds of blood, that makes the life of an operating surgeon so piquant, so attractive, in spite of many difficulties.

Ours, however, is a sense of power for good and what a power it is. Everything goes right almost always and yet what a fierce abridgement of life which we are trying to save, looks a surgical operation at times. Of course, it is of surgery at its best I am speaking, which is only natural in a Syme Memorial Lecture.

To operate in accordance with your diagnosis which you find correct, to suit your performance efficiently with no waste of time or energy, conducting your patient to an almost painless *restitutio ad integrum* as perfect as the nature of the case allows, is to be the author of a work of art, of which the gods themselves cannot rob you. Surely in attaining and wielding this power, there is a sufficiency for the employ of a lifetime.

Another reason why the surgeon enjoys life supremely is that his work is the very quintessence of the present, necessitating absolute concentration on realities. He has more minutes of crowded life than almost any one else; by living so strongly in the present, he enables his patient to live strongly in the future.

Maeterlinck says the God of the bees is the future. The God of the surgeon is an ever present "now." If you did not know the facts of the case you might think I was talking of some super-surgeon but such terms as brilliant surgery, careful surgery, wonder-

ful surgery are all implicit in the one word surgery now and yet one surgeon may be a more daring pilot in extremity than another.

Yet here again, a limiting element exists, extremities in surgery are getting less and less. Thus we can paraphrase the poet and say: "Who would not love thee, divine Surgery." Some, I admit, do not love her, to them she shows not her favours.

She reasons like the flower girl in Imperial Rome, who said: *"Non vendo, nisi amantibus, coronas."* "I sell not garlands, except to lovers." Her empire is man, the body of man from the subungual enchondroma on his big toe, to the bald sebaceous cyst on his similar head.

The empire of surgery and it is good for us to remember that little minds and a great empire go not together, is governed by certain principles or laws, few in number and by certain regulations, many in number.

Having arrived at an age when I can no longer set you a bad example, I am willing to give you good advice, or what I think is such, I hope you won't mind, I have so much of it, it has been accumulating, you know.

Have I your permission, Mr. President, to use an illustration which savours of the lecture room?

One of the laws deals with the enlargement of wounds, so that the surgeon may satisfy himself as to the source of hæmorrhage or ascertain whether a nerve has been cut or a tendon divided or a joint opened.

These things cannot be settled by feeling alone. The injured parts must be seen before proper diagnosis and treatment can be utilized. This is a definite law; of course there are others, but the regulations occupy so much time to learn, that the laws may be overlooked and when their use is required and not exercised a surgical happening of the worst sort occurs.

If you will ask an old man to lecture to you, retrospection must be prepared for and to me these laws are the foundation of the glorious Minster of Surgery.

In mediæval days the masters of the pinnacles paid honourable deference to the builders of the crypts. Today the makers of regulations are apt to forget these fundamental laws.

It is both artistic and knowledgeable to be able to pass a bronchoscope, a gastroscope or a sigmoidoscope cleverly, but it is even finer to save a man dying of hæmorrhage by enlarging the wound in his groin and ligating his *profunda*, instead of tying his iliac and awaiting philosophically the demise of his leg and himself.

Of course it is possible for one man to do all these things. You cannot do harm by following a law, you may do harm in passing a bronchoscope. I admit that what I call good advice may have altered much in a changing world.

The temple of Juno Moneta, Juno the admonisher became the mint for money and you know its radical relation with all evil.

It is difficult to orientate for elderly advice.

> As where North is, at York 'tis on the Tweed,
> In Scotland at the Orcades and there
> At Nova Zembla or the Lord knows where.

However, I think that there are general statements that have a constant true north of their own. For example, we have it on the high authority of Euripides that Zeus hates busybodies and those who do too much.

This apothegm is especially useful to those of us, who following the science and art of surgery have the scientific aspect somewhat more developed than the artistic side. A demonstration of this:

Many years ago two surgeons shared a ward at the Melbourne Hospital. Admitted were two patients with very similar signs and symptoms, including an increasingly painful and tender swelling in the epigastrium with digestive trouble in the history. In one case a small opening into the very tender mass allowed but slightly smelling pus to well out under mild pressure. A tube inserted emptied the abscess and the small wound closed in a few days. The surgeon burst in ignorance as to the position and causation of the abscess, but its owner walked out of the hospital.

The other surgeon whose science made him avid of causes, unavailingly sought the one that made the abscess even to the tip of the appendix and the crack of doom. The ire of Zeus would, I hope, be aroused also by those of us, who aided by the twins, art and science, not content with the removal of a peccant ovary or appendix, proceed to place one twin, art, on the instrument table and with the other twin, science, or the longing to know, to multiply causes of further trouble in the imagination of what is much worse, to seek these causes not in the imagination, but in the patient's belly.

This to me is bad science as well as an absence of art, but the holder of a roving commission (signed by himself by the bye) may say: "But consider, Mr. Bird, an *appendix epiploicæ* may conceal a diverticulum unrecognizable by X rays behind its pad of fat or the spleen may have acquired adhesions with the diaphragm. It is incumbent on me to do my work thoroughly."

I refer such surgeons to Zeus and it is no good advising them to see Minerva on the way. I admit that in the vast complexity of Nature multiplicity of causes occurs, but I am sure if the life history of an appendix or of a gall bladder fits the owner's sensations and symptoms and corresponds with the physical signs found by your clever fingers, that when you have dealt with the erring organ, your surgical zeal should be stayed.

Let your moderation be shown to all men and women on the operating table.

Sir Harry Allen, of glorious memory, used to curtail my vanity before generations of pathology students.

He exhibited a jar with my name on it. From the jar he took a piece of the thickness of the abdomen about three inches long. On the skin surface was a scar seen with difficulty by other observers, but with pride by myself.

He dilated on the beauty of the scar and the ungiving nature of the hidden portion and then he showed the peritoneal surface and the students saw a stout strand of omentum four inches long attached to the centre of my scar.

Here was a case which seemed to be all that an aseptic appendix operation should be and yet you have heard what was found years after. Surely the moral to be drawn is that any interference with the peritoneum may produce adhesions and therefore to seek after causes which most probably do not exist and which have not demonstrated their presence in any way, is wasteful and ridiculous excess of interference.

A Cook's tour round the abdomen may be expected to end at times in a surgical Russia. Exploratory operation because of the inadequacy of our intellect must always be necessary in some cases, but to add exploration to every abdominal operation is surely *trop de zèle,* which above all things is to be avoided.

Nobody trusted the peritoneum more implicitly than I did; in these latter years I but rarely drained its cup of misfortune, but I took great care not to insult it first.

When I was in London three years ago, a very good surgeon and equally good friend told me that the operation of cholecystectomy was, he thought, falling into disuse because patients had so much pain after it from adhesions. Poor friend, he got a lecture on the size of incisions.

That I have done the owners of diseased gall bladders some service I admit and it was done very generally by means of a small incision. If I saw small intestine during the operation (this is true of most of them) I felt I was operating not as well as I should.

Of course there is a small number of cases where a larger incision is necessary. They are generally to be diagnosed.

I left the practice of my profession more than ever believing in incisions the smallest in which the desired abdominal object could be reached and the desired manipulations made. I feel that the mental attitude for very long incisions is based upon two misapprehensions. First, that a surgeon must see all things, second that a surgeon can repair perfectly a cut through fibrous tissue, on whose intricacies æons of evolutionary effort have been expended.

Does one learn more from a long incision, unless it be very long?

When to extreme length extreme retraction is added the whole abdomen cries "O!"

Forgive my lecturing, but it is a thing of high and rare delight to my old age that I have been a surgeon. In a relative world, where man's foothold is always changing, in a world in which a man can imagine neither a limitless universe nor a limited one, it is a distinct fillip to one's sanity to run up against a peccant appendix needing removal; for our profession of surgery has the glorious aptitude of tying us down to something definite.

Alas, this something definite and what is done with it is always changing, but without losing the definiteness.

The impact of John Hunter's wisdom always enlightens:

> Never ask me what I have said or what I have written, but if you ask me what my present opinions are, I will tell you.

Faraday, too, stresses the ever varying nature of science, the placticity of scientific thought, by saying that in knowledge that man only is to be condemned and despised, who is not in a state of transition.

Yet the words of Petrarch will wriggle into an old man's mind:

> By sad experience taught, I learnt at last,
> Wisdom's best rule, to profit by the Past.

He forgot to add that it is the mistakes of the past that are the beacons for the future.

Our President will bear me out that the surgeon at times, especially after periods of stormy intensity, which will even now obtrude themselves on his work very occasionally, sighs for the placidity of medicine, whose votaries, high in the forehead, as in all great qualities, speak with the large utterance of the earlier gods on all subjects.

But even they change, their sapience is settling more and more upon the body politic and leaving the individual body to the juicy mercies of the manufacturing chemist and his attendant endocrinologist, most vulgar of Pandora's train.

Though as you see a man of no standing now, I refuse to be a bundle of dislocated qualities upon which some other animal's hormone may play what stop he pleases. I have no desire to untwist all the chains that tie the hidden soul of hormony and I don't think it has one, unless its home is in the thyreoid gland.

Both surgery and medicine (which is the senior service) are quite eclipsed, as pure science comes above the horizon, but they become the *nonpareil* of handmaidens.

I saw some few cases of very acute tetanus off Gallipoli, the horror of them is with me yet. Suddenly pure science waved her fairy wand and this most awful concomitant of war was seen no more.

Wisdom was, in absolute truth, served out with a spade, when the War Office ordered that all wounds should be treated with tetanus antitoxin immediately on reception.

What a heavenly pallium, a universal cover of protection.

Nature shows her sense of humour by allowing some tetanus bacilli to lie dormant for years in the tissues of a man who has been treated with tetanus antitoxin.

Nobody knows they are there, until an operation wakes them up; but even when they are alive again to their surroundings, their once enormous power for evil has largely gone.

Again, what plenitude of prescriptions or what amplitude of amputational ability could vie in beneficence with the results of typhoid prevention.

If science had but been earlier in its discovery of the relationship between typhus and lice, most of Napoleon's army would have regained France from Moscow and squashing "chatties" would have been a higher military virtue than killing Cossacks.

The modern treatment of Asiatic cholera leaves the surgeon gasping at such geographical benefaction.

Sir Leonard Rogers whom I have the honour to know, fights the dehydration of cholera by moving water about the body where he will, in its priestlike task of pure ablution. He plays upon the whole gamut of salinity, that salinity which we inherited from our mother the sea. He cures a vast percentage of patients. A man well worth his salt indeed!

However, we must wear our new scientific glories with discretion, remembering that progress is in spirals, that even surgery has had set-backs in the past over long periods too.

Is it not true that wounds in Homer are described simply and naturally, in a way befitting the clear Greek mind, they are definite and probable, whilst in the "Morte d'Arthur" written centuries after, wounds are delineated in a puerile way and are children of improbability always.

It was the mystic element that ruled our minds so long, clouding the Greek lucidity. The history of the discovery and rediscoveries of the use of the ligature in surgery does not elate our vanity.

There is, dear audience, an ever-hanging cloud impenetrably dark in places and at times, which obscures our sight of the empyrean. Both medicine and surgery are darkened by it. Its name is diagnosis. It has as many facets as Truth herself. This cloud obscures our view in many ways, not the least of which is that new science so often wipes the eye of older science.

Nevertheless there has been a steady augmentation of our power of looking through this cloud of late years, because of the new windows we have opened in our minds.

We have such joy in these new outlooks that there is a tendency, one of whose parents is laziness of mind, to neglect the old windows through which we have so often peered to advantage in the past searching for the truth.

Wise men keep both old and new windows clean, the subject of this lecture has done so notably. Alas, as Antigone says, "all good things come to mortals with a curse." We have to avoid the curse, which is not always easy. A famous British regiment has on its flag the motto of *Semper Paratus*, which suits our profession as well, but nowadays an additional syllable has crept in and the motto shows in our mind searching for tenuity in the cloud of diagnosis, not as *Semper Paratus*, but as *Semper Apparatus*.

The painters of the Renaissance made their own colours, they did not buy them ready made and we call them masters, remember. Nowadays our profession purchases diagnosis from the radiologist or from the biological chemist or the physiologist or the microscopist and is apt, because of this scientific wealth, to neglect the diagnostic aids which we have used for the purposes of our ordinary life and which are therefore fairly acute in our own person. Eyes, ears, nose and fingers are professionals, whereas many of the new aids to diagnosis are still amateurs.

How are we to investigate the unknown? Why, in the first place, as every other human being does. The professionals, I admit, are not infallible, neither are the amateurs, who sometimes seek to learn about *ignotum per ignotius*.

I yield to no one in my admiration of the value of X rays and of the artistic scientist who places them at our service, but Ormuz and Ahriman are both visible in the realms of the ray.

I used to teach that in a bad Colles's fracture the state of the apex of the interarticular fibro-cartilage was of prime importance, but X rays on this point are as mute as the delphic oracle when the Emperor Hadrian wanted to know the birthplace of Homer. There are many other answers in the negative by the X rays to be culled from surgery. After all it is but a shadow show—

> Some there are who shadows kiss,
> They have but a shadow's bliss

sometimes in diagnosis.

The more specialisms increase the extent of their province and their very *parfait praticien* the acuity of their special vision, the more do the latter become prisoners of their own specialism.

Herein lies a danger for the surgeon seeking help in diagnosis rather than direction in treatment.

Remembering that he had to become a physician before he became a surgeon, he begins to wonder whether the radiologist should have an assistant surgeon or whether the surgeon should aspire to the radiant luxury of an assistant artist in fluorescence.

The radiologist is an artist *au but des ongles*, he is a scientist to the uttermost fringes of his cerebral synapses, but the surgeon sees the shadow show as a side show. The patient is his and he operates on his own imperative, it is his spirit which is elated with success or dejected with failure. But oh, what an art cholecystography is! The window which the radiographer has opened in our mind is indeed a magic casement, rather than a mere opening; but the signposts in fairy lands are sometimes hard for humans to read.

Can we expect the radiographer to be physician and surgeon as well as artist and scientist?

I think the wise surgeon will look upon him as one of a squadron of aeroplanes that brings him information of his enemy, also is he a "bomber" with innumerable particles at his disposal. Even the combined knowledge of many informative aeroplanes of all sorts does not make a perfect diagnostician, this most impossible "he" has not yet arrived, but I bow with grateful deference to those whose art, science and general luminosity are so much to the surgeon.

Looking back over my long association with fine physicians and fine surgeons and other fine students who had not yet taken their degree, my retrospection fills me with admiration for the perspicacity of the profession.

To drag the truth out of a very welter of conflicting evidence and to act on this dishevelled truth in a very jungle of tissues with success is the work of demigods.

How often was success attained? Why, in the very large majority of cases.

Forgive me, dear audience, if I dilate nobly but unnecessarily upon the glories of our brotherhood.

It does me a world of good, for I feel like Virtue for the nonce, defending you, Innocence, for the nonce, from the attacks of Chastity.

You will be glad to hear that I can't speak of abstruse chemical tests, of serums and albumoses. of basal metabolism and of that most finished son of Eblis, the proteid shock-proteid shock indeed, as if there were not enough hydrocarbon shocks beneath our middle-aged waistcoats already. There are lots of other wonderful things which eddying round the surgeon make him inquire whether his empire is dwindling.

Some small provinces will find an aseptic Nirvana in diathermy. Massive X rays are most captiously beneficent in certain cases which cannot be foretold beforehand.

The surgeon may have to sheathe his scalpel for lack of argument in many places. For example, I cannot think that operation will always be the last argument in therapeusis in thyreoid conditions and the demise of various tumours may be attained by other means than the knife.

However, in a mechanized world there will always be accidental injuries and the end of the brute and boisterous force of barbarous men is not yet.

All these things of which I have spoken much, but of which I know little, and many other signs in the scientific heavens implant the hope in our minds that some day we shall lead a willing humanity, clothed with sanitation as with a garment, to dwell to patriarchal age on the glorious foothills of the Delectable Mountains, leaving sorrow and disease in their old habitations. Does not Xenophon tell us that his friend Xenophilus, a musician in Ionia, lived to one hundred and six years of age? A man out of the ordinary; most people die of their last illness, he died of his first.

Multiply one by two thousand millions, the number of people in the world in the happy time to come and the thing is done.

Easy arithmetic, alas impossible realization! We are always upsetting the balance, which Nature with infinite skill and patience establishes on this planet to enable the vast variety of organized beings to live with the least friction.

Evolution is always evolving, so therefore all our science and all our benevolence rolled together in what we think is an irresistible, ever increasing snow ball of truth and strength, is not true enough or strong enough to adapt itself to Nature's ever altering attitudes. She adapts herself more quickly than our adaptations can prevail, so that while general good health will exist more than heretofore and humans will live longer, new diseases and altered old diseases will appear and need combating with our new strength and our new knowledge.

A perfect interaction of harmony between ourselves and our surroundings would be like a world charged with electrons of all the same kind of electricity, nothing would happen, it might be true and nothing else.

A sleeping truth leads nowhere, but a waking error at least leads somewhere and we may learn on our travel. Give me the waking error, humanity is more at home with it. *Croyez moi, l'erreur a son mérite.*

But too much of this, I am neglecting Sir George and he knows that to be always seeking after utilities does not become free and elevated souls.

This quotation is not from a Romanticist, as one might think, but from that Commandant of Common Sense, that Prince of Practicality, Aristotle.

Thus for many years Sir George and I formed units in walking parties who explored Mount Buffalo, Mount Howitt, Mount Cobbler, Mount Bogong, Wilsons' Promontory *et cetera et cetera.*

We revelled in our existence to the *n*th degree loyally enjoying our being, each to his possible.

> For the Cup of Life is for him who drinks,
> And not for him who sips.

We missed nothing—remembering

> Of little threads our life is spun.
> And he spins ill, who misses one.

We were always up betimes to taste the pleasant sunrise. Oh, how the morning air smelt like dawn in Paradise! The man who enjoys hard, is in the nature of things as they appear to us, likely to work hard.

My mind reproduces tonight to me (all of us are audience and actors both and at the same time) one special trip to Buffalo years ago, while Nature still knew not the smell of petrol. There were eight of us and I admit readily we were a fine lot when we left town, but two or three days roughing it took the bloom from us. I remember well when I had walked down the long valley on the way to "the Hump" and waited for the others to catch up. They were walking in Indian file along the curving

cattle track, a disreputable lot in appearance, even Mollison's incurable respectability was hardly in evidence. Why, ladies and gentlemen, they looked like a march-past of the seven deadly sins. Don't be frightened, Dr. Willie Wood. I am not going to allot sins to individuals. Alas, there would be two sins too many, for Muirhead Collins died in London not long ago and Miller Johnson, a member of this great association and whitest of men, sleeps on Gallipoli with honour for his pillow. But whatever we, I mean they, looked like, our blood flowed with luxury in those days, not with uric acid excess. Dear, dear, a second childhood may come, but a second youth lingers.

I remember another incident in the same trip. Sir George will bear me out. We saw a number of mountain cattle coming towards us rather rapidly. Someone observed that they only wanted salt. Remembering, however, that they shared certain cranial outgrowths with dilemmas, all of us made for some big granite rocks, all but George Syme. He, stout fellow, said he would stop them. How the rest of us envied his bravery. His plan of campaign was this: He stood in the line of their advance, they were travelling fast now, there were travellers' tails in the air everywhere. He suddenly turned his back to the bovines, spread out his legs, put his head between them and booed at the cattle. Suddenly he altered his mind and sure proof that the brain is the organ of the mind, his head altered position too. I am thankful he saw the dangers of a topsy turvy world in time.

Nature has been very kind to George Syme in many ways, notably at either extremity, brains and calves, and he ran like the wind to our rocks. We just got him safe when the travellers' tails surged around us and then recovering his breath, he muttered something which we thought had been culled from the early fathers. We fortunately remembered Shakespeare's injunction: "If a gentleman is disposed to swear, it is not for any standers by to curtail his oaths."

I am glad to tell you that Sir George has ever since kept his head in the right place for the conservation of humanity, not in the wrong place for the consternation of cattle.

And now, Mr. President and members of our world-wide British Medical Association, I hope I have not wearied you with my senile prattle.

I know you admit the subjects, Sir George Syme and yourselves have been admirable, but my treatment thereof may have failed.

If you have a sequent headache with arachnoid adhesions, you know the remedy, it is in the air. All I want now is your answer strong in affirmation to two questions.

1. Are you satisfied with the life work of Sir George Syme, to the State, to the Public, to the Profession?

2. Are you satisfied that he has passed the test of Voltaire?

There is another test, that of Montaigne, who says: "The greatest thing for a man is that he be his own"—I know Sir George possesses this thing.

The last question I will put to myself and answer it myself.

Am I satisfied with the fifty year old friendship which has harmoniously subsisted between Sir George Syme and myself? Yes, fully satisfied, but I think the draught should be repeated.

I thank you, dear audience, for your courteous hearing.

GENERALIZED INFECTIONS DUE TO PSEUDOMONAS ÆRUGINOSA (BACILLUS PYOCYANEUS), WITH A STUDY OF THE CHARACTERISTICS OF LOCAL STRAINS OF THE ORGANISM.[1]

By A. B. Lilley, M.B., Ch.M. (Sydney),
Medical Officer, Commonwealth Health Laboratory, Townsville; Acting Director and Pathologist, Australian Institute of Tropical Medicine;

and

A. J. Bearup,
Technical Assistant, Australian Institute of Tropical Medicine.

In five of the cases reported the data which have been collected by us, point strongly to the fact that the infecting organism was *Pseudomonas æruginosa* (*Bacillus pyocyaneus*). In the other four cases which were not available to us at the time of the illness of the patients, there is strong evidence to support the view that they were also infections by the same organism.[2]

The paper commences with a *résumé* of the available literature on this subject. Then follows an account, clinical and bacteriological, of the individual cases. A discussion as to the possible source of infection is next included, followed by a description of the cultural characteristics, pathogenicity, for laboratory and other animals of the local strains of *Bacillus pyocyaneus* isolated from these patients and from the public water supply.

Résumé of Literature.

Attention has been directed by various observers to the frequency in the tropics of human infections due to *Pseudomonas æruginosa* (*Bacillus pyocyaneus*). Hewlett[(1)] and Minett and Duncan[(2)] refer to this characteristic and the former also thinks its pathogenicity greater in the tropics than in temperate zones. Its position as a pathogenic organism is disputed by some and Ford,[(3)] quoting Schimmelbusch, says that "while it can cause local inflammation and general symptoms, it never invades the body at least in adults."

[1] This paper deals with a series of nine cases of fever which occurred at Townsville during the period November, 1926, to January, 1928, in which the initial symptoms led to the diagnosis of typhoid (enteric) fever.

[2] Full credit for the commencement of this investigation belongs to Technical Assistant A. J. Bearup, who first appreciated its significance when there was recovered a culture from the blood of patient F. on January 24, 1927.

P. H. Manson-Bahr[4] also doubts its primary rôle in diarrhœa and febrile conditions and states that it is almost constantly present in fæces after excessive decomposition. Its presence in many conditions has been ascribed by those who regard its pathogenicity as low, to a secondary invasion following a lowering of resistance or provision of a favourable portal of entry by some more highly virulent organism.

There is, however, a constantly increasing mass of evidence that *Bacillus pyocyaneus* can under favourable conditions establish primary septicæmia, not only in children, but also in adults in the prime of life.

An excellent review and bibliography of cases up to 1908 is given by Waite.[5] Most of these cases are well supported by bacteriological evidence and include not only localized infections of the mengines, ear, eye, skin, genito-urinary tract, bones and joints, but also cases of dysentery, infantile diarrhœa and typhoid like fevers.

Many of the generalized infections terminated fatally and many references are made to accompanying pustular rashes.

Justi,[6] discussing intestinal infections with *Bacillus pyocyaneus*, states that from a review of the literature he believes genuine cases of pyocyaneus dysentery which are accompanied by greenish stools containing blood and mucus, do occur. In polluted wells *Bacillus pyocyaneus* is frequently found and in the tropics, where water supplies not uncommonly come under suspicion, the possibility of this organism acting as the exciting cause of enteritis and dysentery should be borne in mind. A large bibliography is appended.

Minett and Duncan[2] in searching for the cause of an acute outbreak of enteritis in Georgetown, British Guiana, found *Bacillus pyocyaneus* in the drinking water. They state it is of occasional occurrence in the stored roof waters which are subject to contamination by crows carrying garbage on to the roofs. Macé[13] regards its presence in water as a bad indication, giving evidence of fæcal contamination and Balfour[7] condemned deep well water in Khartoum on his finding therein *Bacillus proteus fluorescens* (now also included in the genus *Pseudomonas*). He further states that he has observed cases of dysentery to occur from the use of well water containing *Bacillus pyocyaneus* and the systematic "pinking" of such water to lead to a cessation of the outbreak it had caused.

Lartigau[8] reports an epidemic of dysentery in which fifteen persons were affected, four fatally. *Bacillus pyocyaneus* was recovered from their domestic water supply and from the dejecta of patients.

Dold,[9] in Shanghai, has added two valuable contributions to our knowledge by showing the connexion of *Bacillus pyocyaneus* with a typhoid-like fever locally known as "Shanghai fever" or "thirteen day fever." He says these fevers, not uncommon in Eastern Asia, resemble typhoid or paratyphoid in their clinical picture and course. Their resemblances consisted in the onset and course of the fever, enlargement of spleen and especially the appearance of a roseolar rash. Their differences, apart from bacteriological and serological findings, consisted in the consistent absence of a diazo reaction and the definite leucocytosis (up to 40,000). This leucocytosis was mainly due to increased polymorpho-nuclear cells. The duration of the fever was usually sharply limited, not necessarily to thirteen days, but usually the temperature fell to normal in from two to three weeks if no complications occurred. In these cases *Bacillus pyocyaneus* was isolated from the blood, urine, fæces, and roseolæ and agglutinins against this organism were present in dilutions of 1 in 100 to 1 in 400.

The histories are so well given that a typical one might well be repeated here in translation.

CASE 2.—W.L. (German), twenty years old, well developed. Illness began about two days before arrival in hospital (being preceded by a few days of slight indisposition with prostration, headache, fever, and constipation).

On the day of admission the patient's temperature was 39·4° C. (103° F.) in the morning, 40·7° C. (105·2° F.) at midday and 40° C. (104° F.) at evening. Pulse rate 100 per minute. Tongue dry, with greyish-white fur. Patient complained of severe headache, slight sensory disturbance. There was constipation. Heart and lungs normal. Abdomen not tender. Spleen enlarged.

For the following two days the temperature remained between 39·4° C. (103° F.) and 40·6° C. (105° F.), while a maculo-papular roseola-like rash appeared on the trunk (abdomen and chest), which had faded after about six or seven days. On the fourth day from the arrival in hospital numerous thin fluid yellow stools appeared up to eight per day. Three or four days later the evacuations were normal. With the cessation of the diarrhœa the temperature fell by lysis. Fifteen days after arrival in hospital, that is, seventeen days after the onset of marked symptoms, the morning temperature was normal again for the first time. Two days later the noon and evening temperatures were also normal. The patient recovered rapidly and could be allowed out of hospital after a further three days.

Traces of albumin were found in the urine during the fever period. The diazo reaction was always "negative."

During the whole duration of the illness a considerable leucocytosis was present (maximum 30,000), the polymorpho-nuclear cells being mainly concerned.

Result of the bacteriological and serological examination: Despite repeated investigations in various stages of the illness, typhoid and related bacilli could not be cultured either from the blood or from the roseolæ, fæces or urine. But motile fluorescing bacilli grew from the blood, the roseolæ, the urine and the fæces, which from the cultural and biological characters were identified as *Bacillus pyocyaneus* or *Bacillus fluorescens liquefaciens*. The serum of the patient agglutinated these pyocyaneus bacilli from the blood, roseolæ, fæces and urine in a dilution of 1 in 400 (towards the end of the illness), while repeated attempts to agglutinate typhoid and paratyphoid bacilli were always "negative."

Osler[10] wrote:

Bacillus pyocyaneus.—Although this is not a frequent cause of septicæmia and pyæmia, it nevertheless deserves special mention. It is probably not an independent pathogen, but occurs only as a secondary invader in existing lesions especially of the mouth and skin.

Byam and Archibald[11] state:

In addition to the specific organisms of the enteric fevers . . . the following may be recovered on blood

culture and have been thought to be the cause of fever . . . *Bacillus pyocyaneus*. In all cases in which such organisms as the above are thought to play an ætiological rôle, it is well that an attempt to demonstrate corresponding specific agglutinins in patients' blood serum be attempted.

The clinical manifestations caused by these various infections differ little from those seen in various types of the enteric fevers.

In Nelson's "Loose Leaf Living Medicine"[12] it is stated:

The *Bacillus pyocyaneus* is not often an independently pathogenic organism . . . It may become disseminated throughout the general blood stream. Characteristic of the pathology of the *Bacillus pyocyaneus*, when thus disseminated are multiple necroses and hæmorrhages in the skin, the mucus membranes of the intestinal tract, the lungs and kidneys. These areas and many of the arterioles contributory to them are often found to contain masses of the bacilli.

Infection with *Bacillus pyocyaneus* may be acute or chronic. When acute the toxæmia is severe, with high remittent fever, cerebral symptoms, diarrhœa and hæmorrhagic measles-like exanthem or petechiæ. Endocarditis with infarction has been described. Death in a few days is to be expected, but the process may become chronic and a long course of irregular, septic fever ensue, with chills and sweats, neuralgic pains, weakness, emaciation, lethargy and generally death.

Freeman states that in both the chronic and acute forms pleuritic, pulmonary, meningeal and nephritic complications are not uncommon and enlargement of the spleen and liver are constant. Leucocytosis is absent and leucopenia not infrequent from the effect of an apparent leucocidin. Treatment with vaccines has been advised.

Macé[13] describes two types of infection by *Bacillus pyocyaneus*: (i) Cutaneous, (ii) septicæmic. The septicæmic form, he states, is more common. It is a true septicæmia with fever, albuminuria and endocarditis. He then describes visceral involvement in such cases and says that in general infection the organism can be recovered from the blood and visceral juice. He regards its presence in water, where it is often found, as evidence of fæcal contamination.

French[14] in discussing septico-pyæmia states that *Bacillus pyocyaneus* may be cultivated from the circulating blood in infections by this organism.

Chart I.[1]

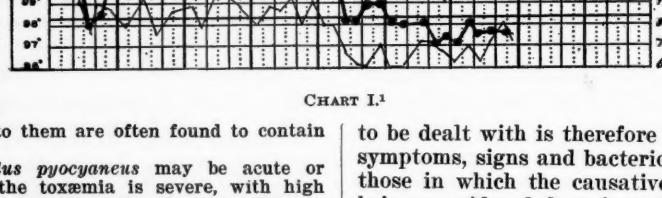


Chart II.

Clinical Histories.

At the beginning of the year 1927 our attention was drawn to a series of cases of fever resembling typhoid and occurring among employees of a local business establishment wherein seven out of a total staff of twenty-eight were attacked.

From the time our attention was drawn to this matter only three of these patients were available for examination, the remainder having attained convalescence, but some details of symptoms, charts and so forth of the latter four were available and are included.

A little later a nurse at the Townsville General Hospital contracted a similar condition. She was not in any way connected with the nursing of the other patients. At the close of the year 1927 another case came under our notice.

The total number to be dealt with is therefore nine and details of the symptoms, signs and bacteriological findings follow, those in which the causative bacterium was found being considered first, in order of the date of onset of symptoms and then those in which no bacteriological evidence is available.

Case I.—Patient F., *ætatis* twenty-four years, was admitted to the Townsville General Hospital on January 19, 1927, and discharged on February 14, 1927. On January 18, 1927, intense headache and pain in all his joints developed suddenly and also in the left side of his chest. He felt hot and could not eat. He vomited once. His bowels acted normally. There was no cough, no pain on respiration and no urinary disturbance. His temperature on admission was 39·5° C. (103·2° F.) and his pulse rate 108 per minute, but his respiratory rate was not recorded. No clinical abnormality was found.

On January 24 a Widal test for *Bacillus typhosus* and *Bacillus paratyphosus A* and *B* was carried out, but no agglutination occurred. A blood culture was made and an organism giving the morphological and cultural reactions of *Bacillus pyocyaneus* was isolated. The patient's serum agglutinated this homologus blood organism up to a dilution of 1 in 80. Subcutaneous injection of this organism into a guinea pig caused its death in twenty-four hours. On February 10, 1927, the fæces and urine were found to be free from organisms of the typhoid group. *Bacillus pyocyaneus* was present.

Case 2.—Patient C., *ætatis* twenty-six years, was admitted to the Townsville General Hospital on January 24, 1927, and was discharged on February 9, 1927.

For four days before admission he suffered from severe persistent headache and pains in the back "like influenza." He could not sleep. His bowels were constipated. There

[1] In this and the following charts the heavy line indicates the temperature readings and the light line the pulse rate readings.

was no vomiting. His urine was normal. Occasionally the patient drinks the public water supply, but generally he drinks tank water.

His temperature on admission was 38·4° C. (101·2° F.), his pulse rate 92 per minute. His respiratory rate was not recorded. His tongue was coated with a moist white fur. There was no abdominal tenderness and no enlargement of spleen. No rose spots were seen. He had a cough.

On January 27 no agglutination was obtained by the Widal test for the members of the typhoid group. An agglutination reaction to a dilution of 1 in 80 was obtained with *Bacillus pyocyaneus* isolated from blood of patient F. The fæces and urine were not examined.

On February 4 bacteria were cultured from the blood. A Gram-negative motile bacillus was isolated. This agreed closely with the cultural reactions of *Bacillus pyocyaneus*, but failed to form pyocyanin. Animal inoculation produced lesions usually associated with pyocaneus infection (see table).[115]

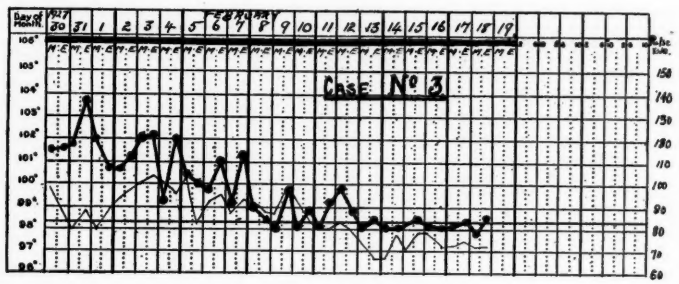


CHART III.

Case 3.—Patient R., *ætatis* thirty-three years, married, with children, was admitted to the Townsville General Hospital on January 30, 1927, and discharged on February 22, 1927.

For two days prior to admission he complained of persistent headache, looseness of the bowels and frequent micturition. He had vague abdominal pain. No other members of the family were affected.

His temperature on admission was 38·7° C. (101·6° F.), his pulse rate 96 per minute and his respirations 26 per minute.

On January 31 the fæces were found not to contain *Bacillus typhosus* and *paratyphosus A* and *B*. *Bacillus pyocyaneus* was present.

On February 1 no agglutination was obtained with *Bacillus typhosus*, *paratyphosus A* and *B*; the serum agglutinated *Bacillus pyocyaneus* in a dilution of 1 in 80.

Examination of the urine did not reveal *Bacillus typhosus* or *Bacillus paratyphosus A* and *B*.

On February 4 a growth was obtained on blood culture. A Gram-negative motile bacillus was isolated, giving the cultural reactions of *Bacillus pyocyaneus* but not forming pigment. It was not pathogenic for guinea pigs.

Case 4.—Patient I.G., a nurse at the Townsville General Hospital, *ætatis* twenty-one years, was admitted to the Townsville General Hospital on March 20, 1927, and was discharged on August 30, 1927.

Five days before admission she complained of severe persistent headache, pains across the small of the back and in the limbs. There was no vomiting and the bowels acted normally. No respiratory, urinary or nervous symptoms were detected.

Her temperature on admission was 37·2° C. (99° F.), her pulse rate 92 per minute and her respiratory rate 26 per minute. Nothing abnormal was discovered on physical examination.

On March 24 the patient's serum failed to agglutinate *Bacillus typhosus*, *Bacillus paratyphosus A* and *B* or *Bacillus pyocyaneus*.

On March 25 no *Bacillus typhosus* or *Bacillus paratyphosus A* and *B* was seen in smears from the fæces or urine.

On March 27 blood culture yielded a growth of *Bacillus pyocyaneus*.

On March 28 *Bacillus pyocyaneus* was not seen in smears from the fæces or urine nor was *Myco-bacterium tuberculosis* detected in smears of sputum.

On April 4 a blood count was made with the following result.

Leucocytes 16,560 per cubic millimetre—Polymorpho-nuclear cells 79·5%, large lymphocytes 5·5%, small leucocytes 8·5%, mononuclear cells 3%, transitional cells 3·5%.

On April 13 an examination revealed that the urine contained no albumin or pus. A few epithelial cells and motile bacilli were present.

A blood count done on April 20 gave the following result:

Leucocytes 15,950 per cubic millimetre—polymorphonuclear cells 56%, large lymphocytes 8%, small lymphocytes 28%, neutrophile myelocytes 6%, large mononuclear cells 1·5%, transitional cells 0·5%.

On April 24, 1927, an operation was performed. A right-sided perinephritic abscess was opened and drained. Cultures of pus gave a pure culture of staphylococcus. Two days after the operation the temperature fell and remained approximately normal for four days when it commenced to swing again.

On June 12 her temperature reached 39·4° C. (103° F.) and was still swinging. On the following day another operation was performed. A left-sided perinephritic abscess was opened and drained.

On June 14 an autogenous pyocyaneus vaccine was commenced.

On June 20 the pyocyaneus vaccine was replaced by an autogenous staphylococcal vaccine prepared from pus from the perinephritic abscess.

The old wound was reopened on July 14 and drained. The temperature fell to normal on July 17 and remained so until August 11 when the patient was discharged.

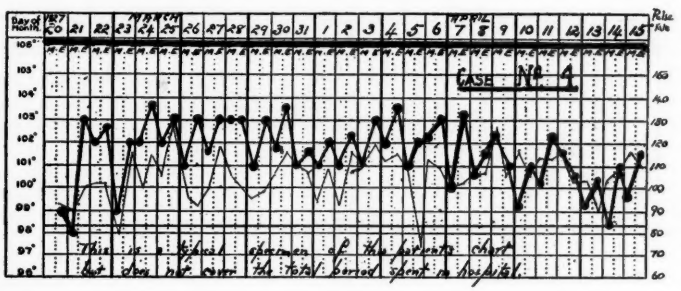


CHART IV.

Case 5.—Patient P.D., a traveller, *ætatis* fifty-five years, was admitted to the Townsville General Hospital on November 29, 1927. He was still in hospital on July 10, 1928.

He had had syphilis and gonorrhœa as a young man. For eight days prior to admission he felt feverish, had shivering attacks and pains in the back of neck and the thighs, legs and arms. He had suffered from headache for some days and could not eat. He was constipated and had vomited twice.

There was no respiratory or urinary disturbance. No deafness or alteration of vision had been noticed. He had been unsteady on his legs for twelve months. He drank the public water supply.

He complained of pains in back of eyes and in the arms on admission. His temperature was 38·9° C. (102° F.), his pulse rate was 92 per minute and his respiratory rate was twenty-four per minute. His knee jerks were absent. Some Rhombergism was present. He had tenderness of his calves. No other abnormality was found.

On November 29, 1927, the blood serum failed to react to the Wassermann test.

On December 1 the serum was found not to agglutinate *Bacillus typhosus*, *Bacillus paratyphosus A* and *B*, but to agglutinate *Bacillus pyocyaneus* in a dilution of 1 in 5.

On December 5 no agglutination reaction was obtained with *Bacillus typhosus* or *Bacillus paratyphosus A* and *B*.

No member of the typhoid group was detected in the fæces or urine on December 29. *Bacillus pyocyaneus* was found in the fæces, but not in the urine.

On December 30 the serum agglutinated an autogenous culture from the fæces of *Bacillus pyocyaneus* in a dilution of 1 in 80 and also a tap-water strain of *Bacillus pyocyaneus* in a dilution of 1 in 80. In neither the fæces nor the urine was *Bacillus typhosus* or *Bacillus paratyphosus A* and *B* found on January 4, 1928. *Bacillus pyocyaneus* was present in the fæces.

CHART V.

Case 6.—Patient T., *ætatis* twenty-nine years, married, with several children, was quite well on November 28, 1926, and played cricket on that day. He had had no previous illnesses and his family history was clear. On November 29, 1928, he complained of headache and general malaise and consulted his doctor. He had no trouble with his bowels, but had some slight difficulty of micturition. He was admitted to the Townsville General Hospital on November 4, 1926.

His temperature on admission was 38·9° C. (102° F.), his pulse rate was 74 per minute and his respiratory rate was 28 per minute. He still complained of headache and his difficulty of micturition was a little aggravated. He drank the town water supply.

No details are available of his symptoms and signs during his stay in hospital, from which he was discharged well on December 22, 1926, but it is presumed that there was nothing abnormal in his physical examination.

On December 6, 1926, a Widal test was carried out, but no reaction was obtained. No further tests were performed.

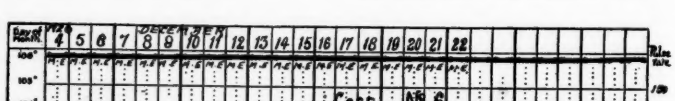


CHART VI.

Case 7.—Patient C., *ætatis* forty-four years, married, with children, was admitted to the Townsville General Hospital on December 6, 1926, with the following history.

He had had a persistent severe headache for the past seven days. No other member of family was affected. He complained of pains in the left side of the abdomen and across the lower part of his back. He had general malaise. His bowels acted normally. He had noticed that his urine was very turbid. He drank the town water supply.

His temperature on admission was 39·0° C. (102·2° F.), his pulse rate was 100 per minute and his respiratory rate was 32 per minute. He was discharged on December 23, 1926. There is no record of findings during his stay in hospital.

On December 9, 1926, no agglutination was obtained in the Widal test and no *Bacillus typhosus* or *Bacillus paratyphosus A* or *B* was seen in the fæces or urine.

Case 8.—Patient H., *ætatis* thirty-two years, married, had no children. He was admitted to the Townsville General Hospital on December 31, 1926, and discharged on January 25, 1927.

One month before admission he had slight diarrhœa; no abnormal colour of his stool was noted. A fortnight before he had had stomach trouble and slight pain over the kidney region, with frequency of micturition. There was no vomiting.

A week before he had been forced to stop work.

On admission to hospital he complained also of "pains in the head and both sides of the body."

His temperature on admission was 39° C. (102·2° F.) and his pulse rate was 76 per minute, but his respiratory rate was not recorded.

On January 5, 1927, the Widal test was carried out with *Bacillus typhosus* and *Bacillus paratyphosus A* and *B*, but no agglutination was obtained. The same result was recorded on January 18, 1927.

Case 9.—Patient W., *ætatis* thirty-seven years, was admitted to the Palms Private Hospital on January 17, 1927, and discharged on February 22, 1927.

Ten days before admission he had complained of general malaise, vomiting, pains in the stomach and back. He had consulted his doctor seven days before admission to hospital.

On January 17, 1927, a Widal test was carried out. No reaction was obtained with *Bacillus typhosus* or *Bacillus paratyphosus A* and *B*. Neither *Bacillus typhosus* nor *Bacillus paratyphosus A* or *B* was detected in the fæces or urine.

During this patient's stay in hospital he early became delirious and was inclined to be violent. Improvement set in nine days after admission.

The Source of Infection.

An outstanding feature is the fact that in all cases only a single member of a family was infected. In the second place during the first outbreak seven employees of one firm were involved (Cases Nos. 1 to 3 and 6 to 9).

The former fact caused us to suspect the diagnosis of typhoid fever, while the latter directed attention to the search for a source of infection at this building. The majority of the patients had been in the habit of drinking the public water supply. An investigation along this line elicited the following facts.

(i) *Bacillus pyocyaneus* existed in this water supply. This was first proved in March, 1927.

(ii) The employees who were infected, used a common drinking vessel.

In order to gauge the value of any agglutination reactions with *Bacillus pyocyaneus* which patients suspected of pyocyaneus fever might give, it was decided to test the serum of a series of patients not suspected of pyocyaneus infection for their agglutinating power with *Bacillus pyocyaneus*. This was rendered necessary also by the fact that a considerable portion of the population of this town drinks the public water supply. A tap water strain was therefore isolated and one hundred patients suffering from various diseases were selected at various times from the wards of the Townsville General Hospital and the agglutinating power of their serum tested against this tap water strain, with the result that the serum of 62% agglutinated this organism, but in no case did this occur above a dilution of 1 in 20.

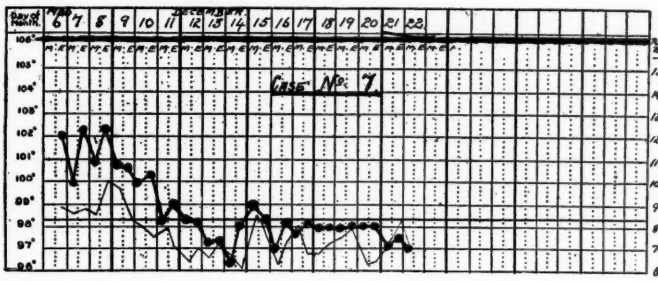


CHART VII.

The series tested was as in Table I.

In order to obtain further evidence of the relation of the tap water strains of *Bacillus pyocyaneus* to the strains isolated from human patients, a monovalent agglutinating serum was prepared by immunizing a rabbit against *Bacillus pyocyaneus* (strain No. 18108, tap water). This antiserum was then tested against cultures of *Bacillus pyocyaneus* obtained from patients whose serum agglutinated the bacilli with the results shown in Table II.

Since 62% of the samples in the series tested for agglutinins for *Bacillus pyocyaneus* showed the presence of agglutinins, it seems that there is some factor other than mere ingestion necessary to infection. It is known that animal passage increases the virulence of this organism. In the first series we noted the use of a common drinking vessel, which apparently was not washed after use.

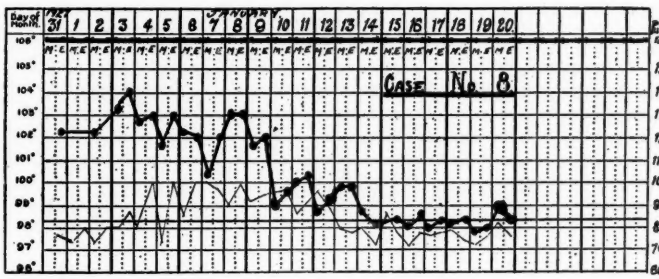


CHART VIII.

Here seems a possible means of transmitting a virulent strain after its passage through the first human case of infection. To demonstrate the fact that patients may harbour this organism without showing signs of infection, the following specimens were examined for the presence of *Bacillus pyocyaneus*.

Since after the first outbreak no further case came under our notice until after the first storm following the dry season, our attention was next directed to the relation existing between rainfall and *Bacillus pyocyancus* content of the public water supply.

Owing to the fact that the water supply had not come under suspicion until March, 1927 (at the end of the wet season), it was obviously not possible to work out this relation for 1926-1927. After the discovery of *Bacillus pyocyaneus* in the water supply in March, 1927, however, routine examinations for the presence of this organism in water were carried out. It was not again recovered from the water until December 21, 1927 (the previous examination was on October 4, 1927). Between these dates there occurred on November 10, 1927, a heavy storm on the catchment area.

The next case of pyocyaneus infection that came under our notice was in a patient who was taken ill on November 22, 1927 (Case No. 5). This seemed to show a tendency for infections to occur after heavy rain had fallen on the catchment area (for

TABLE I.

Table showing the result of agglutination tests with *Bacillus pyocyaneus* (strain No. 18108, tap water) and the serum collected from patients at Townsville General Hospital and from persons not suspected of suffering from pyocyaneus infection.

Serum.	Total Number of samples of Serum Tested.	Number giving an agglutination reaction in serum dilutions.				Number not agglutinating in dilutions of from 1 in 5 to 1 in 40
		1 in 5	1 in 10	1 in 20	1 in 40	
Received for the Wassermann test...	58	46	36	14	0	12
From patients with various forms of pyrexia including four with typhoid (enteric) fever ...	42	16	11	10	0	26
Totals ...	100	62	47	24	0	38

TABLE II.

Agglutination of *Bacillus pyocyaneus* emulsions against a rabbit antiserum prepared by immunizing a rabbit against *Bacillus pyocyaneus* (strain No. 18108 tap water).

Emulsion.	Dilution to which agglutinated.
Bacillus pyocyaneus 18108 from tap water (homologous) ..	1 in 10,000
Case No. 1 Blood	1 in 1,600
Case No. 1 Fæces	1 in 4,000
Case No. 2 Blood	1 in 80[1]
Case No. 3 Blood	1 in 80[1]
Case No. 3 Fæces	1 in 1,600
Case No. 4 Blood	1 in 2,500
Case No. 5 Fæces	1 in 1,280
No. 18235 from tap water 23/3/27	1 in 1,280
No. 26242 from tap water 21/12/27	1 in 1,280

[1] The organism isolated from the blood of these two patients was atypical in its cultural reactions also.

TABLE III.

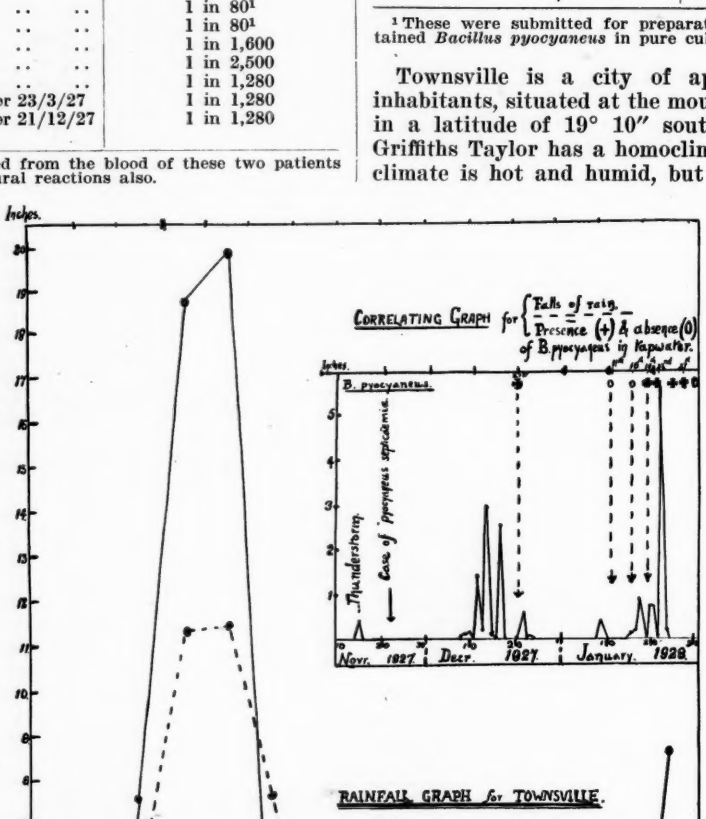
Specimen.	Total Number Examined.	*Bacillus pyocyaneus* present.	Percentage.
Fæces	124	3	2·5
Urine	89	Nil	Nil
Milk	11	Nil	Nil
Throat swabs ..	4,682	18	0·38
Ear discharge ..	3	3[1]	100

[1] These were submitted for preparation of vaccine and contained *Bacillus pyocyaneus* in pure culture.

there had been a series after the commencement of the 1926-1927 wet season, followed by an absence during the dry season and a further infection shortly after the first storm on the catchment area in November, 1927).

The relation of the isolation of *Bacillus pyocyaneus* from the supply mains to the rainfall on the catchment area is shown in the graph and this also bears a definite relation to the occurrence of infections.

These facts directed our attention to a survey of the catchment area, as it seemed that the occurrence of the organism in the supply was probably due to surface washing. A location plan of the wells, weir and pumping station of the Townsville water supply is appended.


Inches.
CORRELATING GRAPH for Falls of rain. Presence (+) & absence (0) of B. pyocyaneus in Vapwater.
B. pyocyaneus.
Thunderstorm.
Case of pyocyaneus septicæmia.
Novr. 1927
Decr. 1927
January. 1928
RAINFALL GRAPH for TOWNSVILLE.
average.
actual for year 1926-27.
Octr. Novr. Decr. Jan Feb. Mar. Apr. May. June. July Aug. Sept. Octr. Novr. Decr.
1926.
1927.

GRAPH I.

The conditions existing on the catchment area are as follows.

Townsville is a city of approximately 30,000 inhabitants, situated at the mouth of the Ross River in a latitude of 19° 10″ south and according to Griffiths Taylor has a homoclime in Calcutta. The climate is hot and humid, but the annual rainfall is not excessive, averaging 124·5 centimetres (49 inches) *per annum*. The Ross River from which the town supply is obtained, rises in a mountain chain about forty-eight kilometres (thirty miles) distant and has an exceedingly variable flow. After heavy rains a flood occurs. If a dry spell follows, the waters subside and the river becomes a chain of waterholes held by rocky bars with intervening stretches of sand. Beneath this sand the water is still flowing and water can be obtained by sinking wells in the sandy river bed or close thereto.

A weir has been thrown across the bed of the river about eight kilometres (five miles) above the city proper. Above this weir the water is pumped from well No. 3 to the central collecting station, from which it is distributed to the city. In the case of certain portions of the city it is supplied direct to the

mains, but in the case of other portions of the city it receives some short period of storage in small reservoirs which, however, do not appear to be able to affect its bacterial content by means of the processes of sedimentation and sterilization by sunlight and other agents.

The water drawn from this well (No. 3) is, therefore, not subjected to any method of filtration or sterilization. Wells Nos. 1 and 2 are not yet in commission. Wells Nos. 3 and 5 are drawn on continuously. No. 5 is subjected to sand filtration. The remaining wells do not appear to be drawn on except towards the end of the dry season when all possible sources are requisitioned.

The water-shed is populated by dairymen and farmers and their livestock has free access to the stored water. Animal excreta can be seen on the catchment area extending to the banks of the river and in all probability are at times deposited direct

Pipe line
To city
Central Collecting Station
RIVER
ROAD
Land on both banks used for grazing farms & suburban residences, with free access to river.
TOWNSVILLE WATER SUPPLY. —
Rough plan. Scale — 100 chs = 1 inch.
Wells shewn thus — ⊙. Pipe lines ....
Nos 3 & 5 used continuously
Nos 1 & 2 not yet ready

GRAPH II.

into the river. In addition the water holes are used as picnic spots and in the hot weather their attraction is enhanced by their use as bathing pools. Human excreta may also be deposited on this area as there is no sanitary arrangement for dealing with them. The water thus contaminated is delivered to the city mains without any purification.

Bacteriological.

Early in this investigation when the bacteriological findings pointed to the infecting organism being *Pseudomonas æruginosa* (*Bacillus pyocyaneus*), it was thought advisable to control all findings with a known culture of this organism. Accordingly we were provided by the Commonwealth Serum Laboratories with a culture of *Pseudomonas æruginosa* (*Bacillus pyocyaneus*) Lister I, which had been received from the Lister Institute in 1917. Table IV gives the cultural characteristics of the organisms isolated from the various cases together with those of the control organism (Lister I). In Table V the result of the inoculation into animals of cultures of *Bacillus pyocyaneus* recovered on various dates from the public water supply is given.

Summary.

1. In this paper it has been shown that in samples of serum collected at Townsville from a series of one hundred persons suffering from various diseases and not suspected of being infected by *Bacillus pyocyaneus*, agglutinins for *Bacillus pyocyaneus* were not present above a serum dilution of 1 in 20.

2. It has been shown also that human beings may harbour this organism in the throat and intestine without showing evidence of infection.

3. A total of nine cases (Nos. 1-9) have been described in which the provisional diagnosis was typhoid (enteric) fever.

In five of these patients (Nos. 1-5) agglutinins for *Bacillus pyocyaneus* were present in the serum in a dilution of 1 in 80.

In two (Nos. 1 and 4) *Bacillus pyocyaneus* was recovered from the blood.

In two (Nos. 2 and 3) an organism was isolated from the blood which gave most of the cultural reactions of *Bacillus pyocyaneus*.

The fifth patient (No. 5) was seen too late to permit of blood culture being performed.

Four cases (Nos. 6-9) have been briefly described. In all of these the laboratory tests for the typhoid group of organisms did not yield evidence of pyocyaneous infection.

4. The possible source of infection has been discussed, followed by a description of the Townsville water supply. The occurrence of *Bacillus pyocyaneus* in this supply has been conclusively proved and the relation which its appearance in the supply bears to the fall of rain on the catchment area, has been shown graphically.

5. The cultural reactions and pathogenicity for laboratory animals of local strains of *Bacillus pyocyaneus* has been worked out and checked against a Lister Institute strain of this organism.

Comment.

Clinical Findings.

In many of the cases the clinical histories are meagre. This is no fault of the writers. They were dependent for these details on records of hospitals and private practitioners and it is regretted that they are not more detailed. The symptoms and signs bear a close resemblance to typhoid fever; indeed the provisional diagnosis in every case was typhoid fever.

In considering the literature on this subject one is struck by the absence of complications in the local cases. In only one (Case No. 4) did any complications occur, but in this instance it was a severe one (bilateral perinephritic abscess).

Animal tests would seem to show a decided affinity of this organism for renal tissue.

Bacteriological and Serological Findings.

On submitting blood and serum to laboratory tests, however, no reactions characteristic of the typhoid group of organisms were obtained, while tests for *Bacillus pyocyaneus* yielded positive evidence in the first five cases.

TABLE IV.—CULTURAL CHARACTERISTICS OF ORGANISMS ISOLATED IN THE PRESENT SERIES OF CASES.

Source of Culture.	Spores.	Motility	Gram Staining	Free Oxygen required	Indol.	Cardinol.	Sulphuretted Hydrogen.	Nitrate Reduction.	Gelatine liquefied.	Inspissated Serum.	Peptone Water.	Reduction of starch.	Pigment Production. (pyocyanin)	Carbohydrate Fermentation.	
														Glucose.	Lactose, saccharose, maltose, mannite, salicin, inulin, galactose, dulcite, adonite, arabinose, dextrin, sorbite.
Blood, Case 1 ...	–	+	–	Aerobic	–	–	+	+	+	Liquefied to a reddish-brown fluid	Definite turbidity with thick pellicle and heavy sediment, medium becoming blue.	–	+	A	No change.
Blood, Case 2 ...	–	+	–	Aerobic	–	–	–	+	–	Not Liquefied.	Definite turbidity and heavy sediment without pigment production.	–	–	A	No change.
Blood, Case 3 ...	–	+	–	Aerobic	–	–	–	+	–			–	–	A	No change.
Blood, Case 4 ...	–	+	–	Aerobic	–	–	+	+	–	Liquefied to a reddish-brown fluid.	Definite turbidity with thick pellicle and heavy sediment, medium becoming blue.	–	–	A	No change.
Faeces, Case 1 ...	–	+	–	Aerobic	–	–	+	+	+			–	+	A	No change.
Faeces, Case 3 ...	–	+	–	Aerobic	–	–	+	+	+			–	+	A	No change.
Faeces, Case 5 ...	–	+	–	Aerobic	–	–	+	+	+			–	+	A	No change.
Tap water, 19/3/27	–	+	–	Aerobic	–	–	+	+	+			–	+	A	No change.
Tap water, 21/12/27	–	+	–	Aerobic	–	–	+	+	+			–	+	A	No change.
Lister (Control) 1 ...	–	+	–	Aerobic	–	–	+	+	+			–	+	A	No change.

The reaction of the cultures in milk remained unchanged from three to twelve days, the casein was coagulated and precipitated. All the organisms produced a slimy greyish or yellowish growth on agar slopes; on agar plates large round colonies formed with a central dense area and a granular filamentous periphery. The colour was greyish-yellow and if characteristic changed late to green. On potato a brownish, smooth, flat, moist surface layer was formed after forty-eight hours.

The organism isolated from the blood of two patients (Cases 2 and 3) shows some slight variation from the typical characteristics of *Bacillus pyocyaneus*. It is felt, however, that these differences are so small as not to weaken the evidence that the organism is *Bacillus pyocyaneus*, for many of the species of the genus *Pseudomonas* fail to liquefy gelatine. Again, this organism may under certain conditions lose its power to form pigment.

It has been found that the best method of preparing agglutinating emulsions is as follows: (i) The organism is grown on agar slopes for twenty-four hours. (ii) It is emulsified in 0·3% of tricresol saline solution. (iii) Chloroform is added to plug of the tube and it is sealed with a rubber cap or stopper. (iv) Chloroform is left in contact for twenty-four hours; the emulsion is then diluted to standard turbidity.

If the chloroform method is not used emulsions tend to autolyse rapidly and become unfit for use.

The following factors would seem to support the view that Cases Nos. 6-9 were also instances of generalized infection by *Bacillus pyocyaneus*.

Epidemiological. — (i) These cases occurred at the same times as proved pyocyaneus infections (Cases 1-3).

(ii) The patients were employed by the same firm as the patients with proved infections.

(iii) They used a common drinking vessel to drink the same water as the other patients.

(iv) It has been shown that *Bacillus pyocyaneus* is a frequent inhabitant of this water supply.

TABLE V.—PATHOGENICITY TO LABORATORY ANIMALS OF BACILLUS PYOCYANEUS CULTURES ISOLATED FROM PUBLIC WATER SUPPLY.

Culture Number.	Date of Isolation.	Animal Injected.	Injection.	Result.	Post Mortem.
18108	19/3/27	Guinea pig.	0·5 c.cm. subcutaneously 24 hours broth culture.	Died in 36 hours	Site of inoculation—engorged and gelatinous œdema. Peritoneal cavity—generalized plastic peritonitis with considerable exudate. Liver—much engorged. Spleen—enlarged and engorged. Suprarenals—enlarged and hæmorrhagic. Lungs—normal. Heart—considerable serous pericardial effusion. Cultures from heart, blood, suprarenals and spleen positive.
18108	19/3/27	Rabbit.	1·0 c.cm. intravenously 24 hours broth culture.	Killed in 9 days.	Bilateral renal abscesses containing *Bacillus pyocyaneus* in pure culture. This organism was also obtained in pure culture in the urine.
26242a.	22/12/27	Guinea Pig.	0·5 c.cm. subcutaneously of agar slope containing 1000 × 10^3 organisms in the 0·5 c.cm. injected.	Died in 19 hours hours.	Subcutaneous tissues congested. Peritoneum congested with flakes of lymph adherent to it. Flaky lymph exudate over liver and omentum. Stomach, intestines and mesentery intensely congested. Kidney, spleen, bladder and lungs showed an intense congestion. Cultures from heart blood gave a pure culture of *Bacillus pyocyaneus*.

Clinical.—(i) The laboratory tests for the typhoid group yielded no reactions. It can be argued, of course, that these tests should have been extended. This aspect will be discussed later.

(ii) There are many points of similarity of the hisaories and charts of these patients and those of patients with proved pyocyaneus infection.

The Source of Infection.

There seems to be conclusive evidence that the source of infection is the public water supply and that the greatest danger exists with regard to Well No. 3. *Bacillus pyocyaneus* can be readily isolated from this source soon after rain falls on the catchment area and in a series of one hundred patients who drank this water 62% showed the presence in their blood of agglutinins to *Bacillus pyocyaneus* to a dilution of 1 in 20. The organism was also isolated from throats and fæces of a number of patients.

There would, therefore, seem to be another factor than mere ingestion necessary for the production of infection by this organism. Perhaps this is to be found in a condition of lowered resistance of the host or increased virulence of the organism brought about by animal passage. It is possible that the latter was the train of events in the initial outbreak. It is highly probable, of course, that the number of infections by this organism is far greater than this paper would seem to show, for it is conceivable that only a small percentage is submitted to laboratory examination. When one considers the gross pollution, both animal and human, which exists in the catchment area, it seems astonishing that a serious epidemic has been escaped for so long.

We have been impressed in this series of cases (and indeed in most cases of fever we are called upon to investigate) by the fact that practitioners do not request blood cultures early in the disease.

Of the value of this test there can be no doubt. It is comparatively easy, after an organism has been isolated, to obtain by means of cultural reactions some idea of its identity.

This was particularly evident in the present series of cases when forty-eight hours after blood was taken from the first case there was the appearance of green pigment in the culture tube. The search for the infecting organism was immediately curtailed and its identity proved almost at once, despite the fact that it was quite unexpected as an invader. To work in the opposite direction, however, and to endeavour to find the infecting organism by the demonstration of possible agglutinins in the patient's serum may mean a limitless search. Again there seems to be no more conclusive proof of the relation of an organism to a disease than first of all to isolate it in pure culture from the blood and later to demonstrate the presence in the patient's serum of agglutinins to the organism isolated from his blood.

From the literature, also, it would seem that a blood count would give valuable information in these infections. A leucocytosis would appear to be a constant feature of pyocyaneus infection as opposed to the leucopenia which occurs in typhoid fever. It is hoped to investigate this point locally.

We would enter a plea, therefore that in all cases of indefinite fever, instead of rushing in and requesting a Widal test, practitioners would ask for blood culture, blood count (white cells) and then agglutination tests.

It is realized that this paper might have produced far more conclusive results. It should be remembered, however, that it was carried out synchronously with exceptionally heavy routine work and that since none of the patients was under our care, we did not have free access to them from the point of view of bacteriological and other examination.

Again, by the time one of us (A.B.L.) had reached Townsville in April, 1927, all of these patients except one (No. 4) had left hospital and therefore many tests (particularly blood counts) that we should have liked to carry out, could not be performed.

It would seem that this series of cases has given a name to at least one of the numerous pyrexias of unknown origin that are the *bête noir* of physicians.

It has therefore become the practice at this laboratory to submit all samples of serum received for agglutination tests for the typhoid group, also for tests for *Bacillus pyocyaneus*.

We wish to express our thanks to Dr. Breinl who first drew our attention to these cases, to Dr. Baldwin, Dr. Heydon and Dr. Brent for suggestions and assistance in translation of literature and to Alderman W. J. Heatley, the Mayor of Townsville, and Mr. S. F. Roberts, Chief Engineer, Townsville Water Authority, who have given us valuable assistance in our investigation of the source of infection.

References.

(1) R. T. Hewlett: "Manual of Bacteriology," Seventh Edition, 1921.
(2) E. P. Minett and L. C. Duncan: *Journal of Tropical Medicine and Hygiene*, 1911, Volume XIV, page 162.
(3) Schimmelbusch: Volkmann's *Klinische Vorträge*, 1893, LXIII, cited by Ford in "Text Book of Bacteriology," 1927.
(4) P. H. Manson-Bahr (Comment): *Tropical Diseases Bulletin*, 1920, Volume XV, page 210.
(5) H. H. Waite: *Journal of Infectious Diseases*, 1908, Volume V, page 542.
(6) K. Justi: *Archiv für Schiffs-und Tropen-Hygiene; Beihefte für Pathologie und Therapie Exotischer Krankeiten*, 1915, *Band* 19, *Seite* 458.
(7) Andrew Balfour: *Journal of Tropical Medicine and Hygiene*, 1911, Volume XIV, page 285.
(8) H. Lartigaut: *Journal of Experimental Medicine*, 1898, Volume XIV, page 285, cited by Waite.
(9) H. Dold: "*Ueber Prozyaneus-Sepsis und Prozyaneus-Sepsis und Prozyaneus-Darminfektionen in Schanghai*," *Archiv für Schiffs-und Tropen-Hygiene; Beihefte für Pathologie und Therapie Exotischer Krankeiten*, 1918, *Band* XXII, *Seite* 365.
(10) H. Dold: "*Weitere Mitteilungen über Pyozyaneus-enteritis*," *Archiv für Schiffs-und Tropen-Hygiene; Beihefte für Pathologie und Therapie Exotischer Krankeiten*, 1919, *Band* XXIII, *Seite* 472.
(11) William Osler: "Modern Medicine, Its Theory and Practice," 1925, Third Edition, Volume I, page 536.
(12) W. Byam and R. G. Archibald: "Practice of Medicine in the Tropics," 1922, Volume II, page 891.
(13) "Nelson's Loose Leaf Living Medicine," Volume I, page 125.
(14) E. Mace: "*Traité Bratique de Bacteriologie*," 1912.
(15) H. French: "Differential Diagnosis of Main Symptoms," 1922, Third Edition, page 597.
(16) P. D. Meader, G. H. Robinson and V. Leonard: "Pyorubrin, a Red-Water-Soluble Pigment Characteristic of Bacillus Pyocyaneus," *American Journal of Hygiene*, 1925, Volume V, page 682. Reprinted in *Collected Papers of the Johns Hopkins University*, Volume VII.

HEREDITARY OPTIC ATROPHY.[1]

By G. H. Hogg, M.D. (Edinburgh),
Launceston.

Hereditary optic atrophy or Leber's disease was first described by Leber in 1871, although von Graefe had described a case as early as 1858 and Beer had drawn attention to the condition in 1817. The onset of the disease is rapid and is often unnoticed until the sight has failed considerably. It usually affects the two eyes simultaneously and to much the same degree, although one eye is sometimes affected later than the other; very rarely one eye may escape.

The sight fails quickly, so that in a few weeks vision may have fallen to $^{6}/_{60}$ or even to counting fingers at a short distance; then as a rule no further loss occurs and indeed some slight improvement may set in. Fortunately the disease never goes on to total blindness, so that the patient usually retains enough vision with which to get about.

Nettleship, Lawford, Batten and others have reported cases in which almost complete recovery has taken place.

The field of vision is not contracted as a rule, but there is a central scotoma for white and coloured objects varying in degree.

Frontal headache is not infrequently complained of; some of my patients have suffered periodically from such headaches years after the appearance of the disease.

Ophthalmoscopic examination may reveal in the early stages a slight congestion and redness of the optic disc with more or less blurring of the margins and this appearance may continue for many weeks, as I have observed in several of my patients. In time the disc becomes pale and atrophic looking, although the atrophy never becomes so great nor do the blood vessels become diminished in size as in primary atrophy.

The usual age of onset is about twenty years, although it may be earlier as well as much later; the greatest age of onset which I have seen was forty, but a case has been recorded in a patient as old as sixty.

The age period is usually about the same for all members of the same family and in these families in which the onset is early, some females are usually affected. When the onset is late, female patients are few in number. Anticipation is, according to Nettleship, fairly well marked, the disease manifesting itself in the members of each succeeding generation at an earlier age.

Some concurrent condition may possibly play a part in exciting the development of the disease in a member of an affected stock, thus I have seen some in whom the excessive use of tobacco was possibly to blame, and Nettleship notes that the presence of diabetes may have predisposed to its onset.

The disease is much more prevalent in males, although it is met with in females rarely. Nettleship's statistics included three hundred males and sixty females, but he was of the opinion that the number of male patients was in excess of this, the reason being that more cases in females are recorded because of their rarity. Leber's proportion was one female to nine males. My figures for Tasmania are three females to twenty-eight males, which is practically the same.

[1] Read at a meeting of the Tasmanian Branch of the British Medical Association on October 26, 1927.

Pedigrees show that it is the males of a family who are usually affected, and that the females escape, but that descent takes place through the female line, a male suffering from Leber's disease seldom transmitting it. An affected female very rarely gives the disease to her sons, but Nettleship believes that she does transmit it to a larger proportion of her descendants than if she carried it latent in the ordinary way.

Several observers state that epilepsy and hysteria are occasionally found in the families affected with Leber's disease and a high early mortality has been noted, especially amongst the male children of some of the affected genealogies, their longevity, however, being about normal. I have not found any definite tendency to nervous disease in the families of my patients, as far as I have been able to trace their history.

It may be interesting to note in relation to Leber's disease, that Dr. James Taylor and Dr. Gordon Holmes in 1913 drew attention to certain cases of nervous disease associated with an optic atrophy of familial type, in which the general symptoms were absence or diminution of the deep reflexes, numbness or tingling in the limbs, most commonly in the feet and hands, pains of a dull aching character and areas of anæsthesia and analgesia; slight sphincter troubles were present in some and in a few of the patients there had been slight mental disturbance at an early stage of their illness. Slight mental symptoms, such as depression, irritability, weakness of memory, dulness have been said to occur in Leber's disease and I have seen such in a patient or two, but I would not lay much stress on these, inasmuch as any person who finds that he is going blind, may be more or less mentally disturbed.

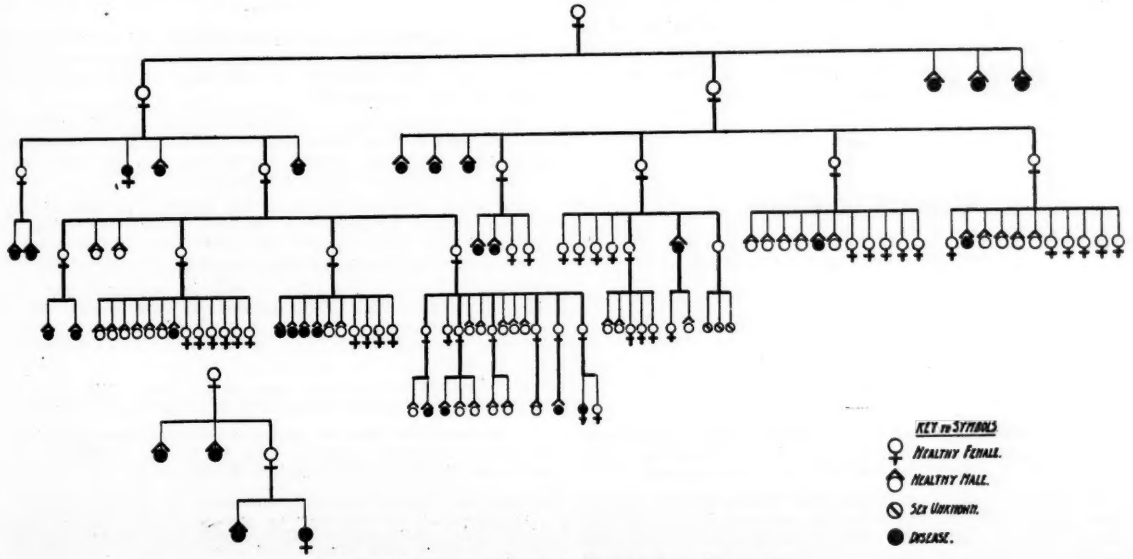
In Tasmania I have not so far met with such cases as have been described by Dr. Taylor.

When one sees the comparatively slight inflammatory condition in the optic disc at the beginning of the disease, it is difficult to realize that so slight a change is the prelude to extensive loss of vision. Unfortunately we have no *post mortem* examinations to inform us as to changes in any part of the optic tract, so that the pathology of the disease is unknown. All that we can say is that there is a retrobulbar neuritis followed by atrophy of the papillo-macular fibres chiefly. The difficulty lies in explaining: (i) Why only certain fibres are affected, (ii) why both nerves are attacked simultaneously and symmetrically, (iii) why the disease occurs chiefly in the male sex and at certain ages, (iv) why females alone transmit the disease.

As regards (i) and (ii) we know, of course, that certain poisons, such as tobacco and alcohol, can produce somewhat similar symptoms, so that we may conceive of some autotoxin as the cause, but (iii) and (iv) still require explanation and I am afraid that to refer the disease to the laws of Mendelian inheritance helps but little.

Fisher has propounded a theory that the disease may be due to some disturbance or enlargement of the pituitary body implicating the visual pathways and that this tendency to pituitary disease may be inherited. He suggested that at the sexual epochs of life changes occurred as physiological processes in the pituitary body and that it was an exaggeration of these with tumefaction which mechanically produced the visual phenomena of Leber's disease. In support of this view he produced some X ray evidence and since then many cases have been published as showing enlargement of the pituitary fossa.

I have had pictures taken of patients of my own, which might be thought to show similar findings, but Dr. Holman, our radiologist, tells me that they really show nothing abnormal.



Genealogical Trees of Patients Described by Dr. Hogg.

He has referred me to an article by Schüller, of Vienna, on the *sella turcica*, in which he states definitely that the pituitary gland may be hypertrophied without causing a visible enlargement of the *sella*, that the shape and size of the pituitary fossa vary and that there are several types dependent not on the pituitary gland, but on the conformation of the sphenoidal sinus; the different kind of bridges which have been described as pathological are really normal.

On the other hand, Timme, of New York, states that enlargement of the pituitary gland may produce erosion and enlargement of the fossa and is the cause of some of the varieties of migraine, X ray examination in such cases showing erosion of the clinoids, enlargement of the cavity itself and even a breaking through of the walls.

On the whole the evidence in favour of Fisher's theory cannot be regarded as conclusive, nor is it easy to postulate a transient disturbance of the pituitary gland causing this form of blindness, although Timme's views about pituitary inadequacy associated with small *sellæ turcicæ* of hereditary character must be borne in mind.

The family pedigrees shown by the accompanying chart may be taken as fairly correct, but not necessarily complete, inasmuch as the information about some families has been difficult to obtain and there may be more persons affected than I have been able to trace; in the later generations, too, some of the younger members may develope the disease as they become older. One of the patriarchs of the stock told me some years ago that there had been a tradition of blindness amongst them for generations.

The record of two families was published by me in 1915; since then, however, they have been found to have a common stock.

My apology for reading to you a paper which contains nothing new or original, is because of a request coming from some of our members to whom I have demonstrated the condition in some of the patients from time to time.

Reports of Cases.

HÆMORRHAGIC CHOLECYSTITIS.

By ST. JOHN W. DANSEY, M.B., Ch.M. (Sydney),
Honorary Surgeon, Royal Prince Alfred Hospital, Camperdown; Lecturer in Clinical Surgery, University of Sydney.

N.U., a planter, married, aged forty-five years, complained of severe pain in the upper part of the abdomen. The pain had been present on and off for three months.

The patient had lived in the New Hebrides for twenty-three years. During that time he suffered from a succession of malarial attacks. Three months before I saw him he had an attack of blackwater fever. For a period of ten years he had suffered from indigestion, characterized by pain in the epigastrium after meals and flatulence. During the attack of blackwater fever the pain in the epigastrium became very severe. He had a similar attack one month before coming under my care and his last attack had been of forty-eight hours' duration.

The pain during these attacks was situated in the epigastrium, it spread to the right side and round to the back and lodged between the shoulder blades. The pain was of a severe stabbing character in front and a dull ache was present in the back. With each attack the skin became yellow and the urine very dark in colour, but the stools did not become clay coloured. The patient stated that he belched up considerable quantities of wind during and in between the attacks. He did not complain of vomiting. His appetite remained good during the attacks and his bowels always acted well. Since the attack of blackwater fever he had complained of feeling weak and of being short winded.

On examination he was seen to be very thin and anæmic. The skin and the sclerotics were yellow. His tongue was moist and clean. His abdomen was quite soft. The spleen was palpable. Tenderness was detected in the gall bladder region on deep pressure, but this sign disappeared within twenty-four hours. No other abnormality was discovered in the abdomen. The other systems were normal. No malarial parasites were found in the blood. No biliary calculi were detected on X ray examination.

Cholecystectomy was performed. The gall bladder which was quite free, was removed. Its walls were found to be very thickened and fibrotic and the lumen was full of tough, semi-solid material like old blood clot. On examination by a pathologist this was found to consist of blood pigment, no bile pigment being present. The patient made an uneventful recovery.

It was concluded that the patient's symptoms were due to the efforts of the gall bladder to expel the tenacious altered blood which had found its way into the viscus as the result of hæmorrhages from its mucous membrane during the attack of blackwater fever.

Reviews.

SURGERY.

WHILE reading the first few chapters of Hey Groves' "Synopsis of Surgery"[1] there comes an involuntary feeling that such a high standard of excellence and completeness could not be maintained.

But this foreboding proves to be wrong, for if anything the material is even more ample. We consider it remarkable that so much sound knowledge can be contained within the compass of such a book.

Moreover, another outstanding feature is the ability of the author to hold the reader's attention. Usually books of this nature prove as enthralling as the average auctioneer's catalogue, but this one is delightfully different.

From the above remarks it will be gathered that we have formed a very high opinion of this work. It is an invaluable volume both as a work of reference for the surgeon or practitioner and as a means of revision for the student.

It is complete, accurate and up to date. We have no hesitation in recommending it to whomsoever it concerns.

A preface contains the author's acknowledgement of the valuable assistance given to him by Mr. J. J. Robb in the revision of this eighth edition of the work.

[1] "A Synopsis of Surgery," by Ernest W. Hey Groves, M.S., M.D., B.Sc. (London), F.R.C.S. (England); Eighth Edition; 1927. Bristol: John Wright and Sons, Limited. Crown 8vo., pp. 680, with illustrations. Price: 17s. 6d. net.

The Medical Journal of Australia

SATURDAY, MARCH 24, 1928.

Surgeons and Their Outlook.

The fact that Mr. F. D. Bird was chosen to deliver the first of the George Adlington Syme Triennial Lectures will be received with satisfaction by the medical profession throughout Australia.

Syme and Bird are household names among surgeons of the Commonwealth and the reputations of both men are by no means limited by its boundaries. It is but natural that Mr. Bird should speak of his friend in terms which indicate at once his admiration and affection. The lecture which is published in this issue, is pregnant with wisdom and replete with lessons for those of a younger generation. Onlookers are said to see most of the game, but an onlooker who has played the game from many positions in the field, who knows its intricacies and its pitfalls, can speak with authority and will be listened to with respect. Among the lessons instilled by Mr. Bird is the fact that the empire of surgery holds no exalted places for the small-minded man. To be large-minded is to have breadth of vision and this is impossible without knowledge and understanding. Large-mindedness on the other hand must not be allowed to run riot. Mr. Bird rightly sees this danger and in his inimitable way pleads for moderation, since "a Cook's tour round the abdomen may be expected to end at times in a surgical Russia." No one will deny that there are lessons which must be learned and learned for all time by every would-be surgeon. They come not, however, in a flash; they are acquired not only as a result of experience in the ward and the operating theatre, but from a knowledge of other branches of medicine and from rubbing shoulders with men and from general experience of life. This applies to all medical practitioners as well as to the surgeon, although it is quite true that the latter is more apt to become engrossed in his work and to live in a groove.

With the dawn of civilization man ceased to grope in the dark and gradually emerged as it were into the light of day. In the earliest days of human life man was endowed with primitive interests—the instinct of self-preservation and that of procreation. He was dependent for his living on his prowess as a hunter and had few cares other than those connected with the provision of the material things of existence. It was inevitable as time went on that one man became more expert than another at certain pursuits and that his fellows, finding that it was so, allowed him to do for them what they were unable to do so well for themselves. In other words specialization was bound to arise. At first the other man knew how to do what the primitive specialist undertook to do, but there came a time as experience grew, when this was impossible. That has become more pronounced with the effluxion of time; individual subjects have grown to such an extent that it has been necessary to subdivide them. Medicine, for example, is such an enormous subject that no one person can master the minutiæ of its every branch. As further channels of knowledge are explored, it will become increasingly difficult for the man who would have a comprehensive view of the whole of medicine—his horizon will become wider and perception of detail will be lost. One of the results of over-specialization has been the neglect of other intellectual pursuits and of the æsthetic. When these are forgotten a due sense of proportion is impossible, for material things alone cannot make the full man or satisfy his needs. Material things in this sense include knowledge gathered for its monetary worth and not for the cultivation of the mind or the good of humanity. A writer has recently pointed out that although the delimitation of spheres is not achieved without friction, an attitude of mutual tolerance has been established. This attitude of mutual tolerance is eulogized as constituting that freedom of thought which is the most priceless gift of modern centuries. The writer in question sees danger in the present situation. There is great need to remember that only within certain limits does specialization go hand in hand with real freedom of thought. Beyond these limits it becomes the minister of intellectual slavery. "The narrow-

mindedness of the expert, whose judgements are completely limited by the outlook he derives from his special subject, is one of the great dangers of modern civilization. Left to himself, the specialist continues to dig his own pit and to sink into it until he is apt to take for a horizon what is in reality only the edge of his grave."

So much for the present state of affairs—specialization is necessary and unavoidable and it may be associated with certain dangers. How are these to be met? The teachers of philosophy would have us look at the world through their eyes and by a leaven of philosophy would save the world. This is all very well up to a certain point, but their writings often make it appear that they can see little beyond the edge of their own pits. To return to medical practitioners in general and surgeons in particular. Mr. Bird's breadth of outlook and the moderation which he advocates, will not be obtained until surgeons realize that there are other spheres of activity than their own. They must to begin with have some experience of the work of others. Moreover, having undertaken their specialty, they must be prepared to leave it occasionally and to inspect if not actually to share in the work of their *confrères* and of those who labour outside the boundaries of medicine. Given a preliminary education which trains his mind to be receptive and appreciative, a surgeon can train himself to mix with other medical practitioners in their discussions, he can understand their problems and perchance make useful suggestions. Further he can cultivate intellectual pursuits, literary, æsthetic and otherwise and he can give his quota to the building of national character. But the mind is like a garden—it needs constant care and attention. In this way others will be able to answer in the affirmative about him the questions which Mr. Bird applies to Sir George Syme at the close of his address and with the same sincerity and conviction.

Current Comment.

THE CAUSES OF STILL BIRTH.

EVERY obstetrician and every hygienist of the present day seem to have accepted the axiom that ante-natal supervision of expectant mothers will inevitably reduce the frequency of death of infants before, during and after birth to an almost negligible figure, as well as safeguarding the life and health of the women themselves. That skilled examination repeated at intervals throughout pregnancy is a very valuable measure cannot be denied. It should be universally applied, for by its means the dangers of child birth may to a large extent be anticipated. It is wise, however, to realize that prescience of an impending disaster does not necessarily carry in its train the power to remove the pathological cause nor to eliminate the mechanical defect. Moreover, prematernity care demands a considerable degree of skill and a highly developed diagnostic acumen. It may be extremely difficult to recognize renal, cardiac, pulmonary, intestinal or nervous changes in their early stages or in their latent forms. Syphilitic or gonorrhœal infections may be overlooked. There may be no reliable indications of disproportion between the ultimate size of the fœtal head and the pelvic cavity of the mother. This merely means, however, that the control is valuable in direct proportion to the amount of care, of skill and of ingenuity exercised at the examinations. It is of the utmost importance that the cause of death of the infant before, during and soon after birth be known, in order that the most effective measures may be taken at the most appropriate time. The publication of a special report of the Medical Research Council on a study of the clinical and pathological data in connexion with the death of sixteen hundred and seventy-three infants was regarded as a most significant event. This impression was enhanced by the foreword by the Secretary of the Medical Research Council in the course of which he emphasized the practical value of the work of Eardley L. Holland and Janet E. Lane-Claypon.[1] Unfortunately we cannot share the enthusiasm of the writer of the preface. Apart from the careless wording and frequent obscurity of the authors of the report, their material was so incomplete and unreliable that a criticism seems to be justified as to the soundness of their deductions. The authors reiterate in almost every chapter their regret that the amount of information collected was insufficient to enable them to utilize it for their general calculations. The information was obtained from London, Glasgow, Liverpool, Edinburgh and Cardiff. It was collected by ten workers in these cities and arranged in accordance with questions embodied on a form. It covers no less than 1,269 still births and 404 deaths of infants shortly after birth. The scheme on which they worked was to ascertain the incidence of the ascribed causes of death of the infants. In the first place there are the complications of labour, including contracted pelvis, transverse presentation, breech presentation, prolonged or difficult labour with face presentation, brow presentation and occipito-

[1] A Clinical and Pathological Study of 1,673 Cases of Dead-Births and Neo-Natal Deaths, by Eardley L. Holland and Janet E. Lane-Claypon, Medical Research Council, Special Report Series, No. 109, 1926.

posterior presentation, difficult forceps delivery, excessive size of the fœtus, premature rupture of the membranes, precipitate labour, prolapse of the cord, coiling of the cord around the fœtus, dystochia, normal labour with excessive cranial stress or with asphyxia and "other complications." The second group comprises *placenta prævia* and accidental hæmorrhage. Then there are the so-called toxæmias of pregnancy, eclampsia and albuminuria. Syphilis is divided into certain, probable and possible. Under the group of maternal diseases are included chronic renal disease, cardiac disease, tuberculosis, pneumonia, bronchitis and empyema, intestinal obstruction, epilepsy and "other diseases." A separate group is allotted to the pathological processes affecting the placenta. The fœtal affections include hydrocephalus, anencephaly, *spina bifida*, general œdema of the fœtus, other deformities, multiple pregnancy, hydramnios and "other affections." The last five groups are undivided. They are prematurity, unknown causes, deaths due to post-natal causes, non-viability and deaths concerning which insufficient information was available. The authors start with a simple classification of the reputed causes of death in numbers and in percentage frequency. The incidence in London according to Eardley Holland is compared with the ascribed incidence in Baltimore according to Whitridge Williams, in New York according to Holt and Babbitt and in San Francisco according to McQuarrie. They admit that certain of the groups have not been dealt with in the same manner by the ten persons contributing the information on which the report is based. It is perplexing to find that in the five sets of figures, those from London, from Glasgow, from Liverpool, from Edinburgh and from Cardiff, the incidence of syphilis as a definite or possible cause of infantile death varies from 7% to 11%. Holland's own figures for London are practically double those used in the report. The incidence of syphilis as a cause of infantile death is given as 15·5% for San Francisco, 15·3% for London, 12·8% for Baltimore and 8·3% for New York. The New York returns are derived from the statistics of the Sloane Hospital to which women with obvious syphilis are not admitted. The diagnosis of syphilis is regarded as certain when the *Spirochæta pallida* is identified in any of the organs or when osteochondritis is present. Syphilis is regarded as probable when the maternal serum reacts to the Wassermann test or when osteochondritis is probable. No mention is made of the result of the application of the Wassermann test to the fœtal blood serum. Possible syphilis is entered when clinical or pathological evidence of syphilis in the mother, placenta or infant is recorded. They have transferred to the unknown causation group the deaths ascribed to possible syphilis without records of definite clinical or pathological evidence of a luetic infection. Of the 1,673 infants 91 are said to have died of certain syphilis, one of probable syphilis and twenty-two of possible syphilis. This gives a total of 114. It would appear that the criterion of a syphilitic infection has been regarded by the ten contributors in accordance with their individual opinions. No mention is made concerning the manner in which the Wassermann test was conducted. It is obvious that spirochætes will be found in only a proportion of infants who have died of the disease and in a still smaller proportion of those infected who have died of some other process. Moreover, the incidence of syphilis in women and their babies will vary in different communities and under different conditions. The effect of treatment of the mother is important. In the Edinburgh statistics 10·8% of the deaths are ascribed to prematurity. But prematurity is not a cause of death. An infant may be born prematurely as a result of trauma, as a result of a maternal disease or a result of the deliberate act of the mother or as a result of some fœtal abnormality. Syphilis probably causes some infants to quit their mothers' wombs before time and if the infection is not virulent, it is possible for the infant to die within a short time without manifesting any signs or symptoms of the syphilitic infection. The perusal of the report leads to the impression that the causes of fœtal or infantile death are tabulated in accordance with apparent results rather than on strict evidence. That the authors have formed the conviction that the mechanical causes are more important than the pathological is evident. This conviction is supported by some valuable data, but the argument would be more powerful if there had been greater uniformity of record by the ten contributors and if the authors had dealt with the figures in a more objective manner.

The chapter on intracranial injuries contains some definite information. Tears of the tentorium have been sought and are rightly regarded as potential causes of death. All the macerated fœtuses are excluded for obvious reasons. The same obtains in regard to infants delivered by craniotomy. The figures reveal the disquieting information that 26·3% of the infants who died during or soon after birth, had lesions of the *dura mater*. Breech presentation and delivery with forceps seem to favour the risk of damage to the tentorium. Holland and Lane-Claypon's statement is unfortunate. It is that "tentorial tears occur not less frequently than in one-half of all the cases of spontaneous breech delivery and that interference with forceps causes roughly the same proportion of tears in all cases." It must be remembered that they are not dealing with the results of all breech presentations and deliveries with the aid of forceps. They are dealing with a number of infants who met their death before, during or after birth. In order to obtain the true state of affairs it would be necessary to determine the actual proportion of deaths of infants delivered by the breech and with the aid of forceps. It could then be demonstrated in how many infants tears of the tentorium had led to death in each hundred. The relative danger of forceps delivery and of breech delivery would then be known.

It was found that no less than 35·5% of the deaths were attributed to complications of labour. Allowing that these complications of labour represented the actual and sole causes of death, the fact would be established that the gravest risk for the fœtus is a mechanical one. The authors give many details concerning the method of delivery, but the most important information cannot be gathered, namely the degree of skill exercised by the obstetrician in applying forceps, in performing version or in awaiting events. No one will challenge the correctness of the authors' conclusions that many of the deaths arising in this way could be prevented by ante-natal supervision and skilled obstetrical care. They speak of women who die undelivered; their infants follow the mothers to the grave in almost every instance. They record the fact that accidental hæmorrhage is often permitted to continue for a long period even when a medical practitioner is in charge. They show that preventible conditions like eclampsia and the albuminuria of pregnancy are often unanticipated and that the lives of both mothers and infants are thus sacrificed. The report contains much valuable information and the authors indicate the remedies that should be applied. While we contend that the authors have dealt with data that are obviously too ununiform and too little reliable for their purpose and have been tempted by their enthusiasm to attach too much importance to some of this incomplete information, we do not wish our criticism to be regarded as destructive. The only way to combat the enormous sacrifice of infant life is to extend ante-natal supervision to every pregnant woman and to take steps to insure that every obstetrician and every midwife are competent to safeguard the lives of the parturient woman and her baby.

THE FAT CONTENT OF THE THYREOID GLAND.

IN August, 1927, there was published in this journal an abstract of an article by R. H. Jaffé on the fat content of the normal thyreoid gland. He stated that lipoid droplets are constantly found in the epithelial cells of the thyreoid after the first year of life. With advancing age the glands were found to become richer in lipins. Glands rich in fat were more frequent among persons over forty years of age than among younger groups. In some very old people a gland containing but little fat was seen. Jaffé held that the lipoid droplets found in the epithelium are the result of the secretory activity of the epithelial cells. He expressed the opinion that it was impossible to determine the factors which might influence the intensity of lipoid excretion and thought that diseases did not seem to have any influence.

Jaffé has now turned his attention to the fat contents of pathological thyreoid glands.[1] He has studied two parenchymatous goîtres, twenty exophthalmic goîtres, twelve adenomatous goîtres, three adenomatous and exophthalmic goîtres, eight atrophic glands, one gland affected by acute purulent inflammation, one affected by chronic inflammation (Riedel's struma), one by tuberculosis, one by malignant adenoma and two by adeno-carcinoma. Most of the specimens were obtained by operation. It is not necessary to give Jaffé's findings in these conditions *seriatum*, but to refer to them only in so far as they have to do with the general significance of the fat content of the gland.

The first point of interest is that he has reversed his original statement and now affirms that the decrease in fat which he has noted, is the result of diseases. There are two possibilities in connexion with the fat droplets. Either they are waste products of metabolism or else they are concerned in the vital processes of the thyreoid. In his first article Jaffé described dust-like granules in the epithelial cells appearing between the nucleus and the internal margins of the cells. These granules grow, become more numerous and are finally discharged into the central lumen. After the cell has given off its fat content the process of lipoid segregation begins again. From this description it is impossible to determine the nature of the process. In the article under consideration he points out that in adenomata the regressive changes cause the appearance of fat which is degenerative in nature and which according to staining reactions is different from the lipoid substances of the normal thyreoid. Fat of this nature is obviously different from that found in exophthalmic goître. In many glands of the latter type which Jaffé studied, the microscopical picture had been influenced by iodine medication prior to operation. Iodine treatment brings about a return from the hyperplastic stage to the resting stage. He discovered, however, areas in which the hyperplastic changes persisted. He found a few instances of an increasing hyperplasia without apparent morphological effect produced by the iodine. He noted great irregularity in the distribution of the lipoid substances resulting from the structural changes of the hyperplastic epithelial cells. With progressing vacuolation of the cytoplasm the fat disappeared. Fat was also absent from the lacunar cells and lipoid-carrying spheroids were absent from the vesicular content. In only two of the twenty glands from patients with exophthalmic goître were the fat granules numerous or did they reach the size of the droplets in normal glands. Jaffé also concluded that if the vacuoles decreased under the influence of iodine treatment, the lipoid droplets became more distinct. Jaffé believes that the differences in the fat content between the normal thyreoid and the exophthalmic goître are more in favour of the latter condition being a manifestation of a dysfunction than a hyperfunction of the thyreoid gland. It will be remembered that Williamson and Pearse in their important work on the thyreoid gland maintained that Graves's disease is a dysthyreoidism and not a hyperthyreoidism (see THE MEDICAL JOURNAL OF AUSTRALIA, April 10, 1926).

[1] *Archives of Pathology and Laboratory Medicine*, January, 1928.

Jaffé frankly does not venture an opinion as to what influences the lipoid content; he merely states that it is difficult to determine this. His observations on exophthalmic goîtres would justly give rise to the view that fat plays an important part in the normal activity of the thyreoid. Some of his other findings, however, suggest that this is not so. Thus, in atrophy of the gland the vesicles were small and filled with thick homogeneous, partly basophilic colloid, the epithelial cells were low and cuboidal, the interstitial tissue was increased, but loose. The lipoids on the other hand were in no way different from those of the normal gland. Further, in malignant epithelial tumours of the thyreoid fat could not be detected in affected areas, but was abundant outside these portions of the gland. It will be remembered that Williamson and Pearse suggested that there was some major function over which the thyreoid gland presides and that anomalies of this function might be reflected in the thyreoid gland. Jaffé is undoubtedly right when he states that it is difficult to determine the factors influencing the lipoid content of the gland. It may be useful to remember the views of Williamson and Pearse when the subject of the fat content is being considered.

A SKIN TEST FOR RHEUMATIC FEVER.

ACCORDING to the teaching of Ehrlich endotoxins are incapable of inducing a biological reaction leading to the appearance of an antitoxin. In 1892 Pfeiffer isolated poisonous substances from the bodies of cholera vibrios which he called endotoxins and to which he ascribed specific properties. It appears that according to the views held up to about 1910 the several coccci do not produce exotoxins. It has been found, however, that the proteins of the protoplasm of cocci and many other bacteria formerly regarded as non-toxin producing, are endowed with specific or group specific properties. Many bacteriologists have endeavoured to attribute rheumatic fever, scarlatina, puerperal fever, septicæmia, erysipelas and a few other infective diseases to separate varieties of streptococci. The actual specificity of these various forms has been challenged by several workers. There is no doubt concerning the power of these forms of streptococci to produce soluble poisons in suitable culture media and but little doubt that these toxins are endowed with biological properties which do not correspond with those of the typical endotoxins of the Ehrlich period. Some workers venture to regard them as true exotoxins, but much more convincing evidence in favour of this view must be adduced before it can be accepted. Until the direct evidence is forthcoming, it will be wise to suspend judgement in regard to the specificity of the biological reactions induced by these toxins.

Last year K. E. Birkhaug claimed that he could obtain a typical intradermal reaction in rheumatic subjects to injections of a soluble exotoxin from a non-methæmoglobin producing streptococcus grown from the blood of a child with rheumatic fever and endocarditis. Applied in a manner similar to that used in other intradermal tests he obtained reactions in about 70% of persons with rheumatic manifestations. On the other hand there was no appreciable difference in the power to react to the hæmolytic streptococcus of erysipelas or to the green-producing streptococcus between normal and rheumatic persons.

A. D. Kaiser has endeavoured to control Birkhaug's findings and is prepared to accept this diagnostic test with reservations.[1] He injected 0·1 cubic centimetre of toxin diluted one hundred times. The result of the test was determined after twenty-four hours. No less than eight hundred and one children were subjected to the test. Their ages varied from one week to sixteen years. There were eighty-seven children under two years of age. Of these only one yielded a reaction. This was a child aged ten months who had had several attacks of sore throat. A reaction was obtained in approximately 25% of the children between the ages of two and seven years. The typical reaction was noted in about 50% of the children between nine years and fifteen years. The author divides the group of children with rheumatic infections into four sub-groups, those with chorea, those with rheumatic fever, those with rheumatic endocarditis and those with joint pains. To these he adds those with scarlet fever. It will be seen from his figures that there were ninety children and a reaction was obtained in sixty-five of these, that is 72·2%. Nine out of thirty-two children with scarlatina reacted, which is equivalent to 28%. Of the children whose history did not suggest a rheumatic infection, 20·5% reacted. Of a group of children who suffered from repeated attacks of sore throat, 25·7% reacted. Kaiser suggests that some of the apparently normal children may have had a rheumatic infection without any recognizable or definite manifestations.

Kaiser is not prepared to decide whether the reaction to this test indicates a susceptibility to infection with the streptococcus isolated from a child suffering from rheumatic fever or is an allergic phenomenon of a specific nature analogous to the reaction to the tuberculin test. But he holds that his results support the view that there is a distinct biological relationship between the toxin produced by the streptococcus and the hypersensitive state of persons with rheumatic infections. While his figures reveal that in his and in Birkhaug's hands the test yields a reaction in a high proportion of persons known to be infected with rheumatism, it must be recognized that nearly 28% of the rheumatic children failed to react and that 20% of the normal children reacted. These frequencies are sufficiently high to awaken suspicion that the strain of streptococci employed is not the only organism involved in rheumatic infections and further that the phenomenon may be an anaphylactic response to a streptococcal protein and not a direct result of a rheumatic infection.

[1] *The Journal of Infectious Diseases*, January, 1928.

Abstracts from Current Medical Literature.

THERAPEUTICS.

Treatment of Infectious Diseases.

J. H. MUSSER (*Journal of American Medical Association*, April 9, 1927) reports that the results of the treatment of scarlet fever by streptococcal serum have been uniformly good. The dose of the serum employed is ten cubic centimetres administered intramuscularly. This causes a rapid disappearance of the rash, a drop in temperature by crisis or quick lysis within twenty-four hours and a very general freedom from the perilous complications of the disease. Throat symptoms quickly vanish and although serum rashes are not uncommon or a troublesome urticaria may develope, the general results are a speedy and slight desquamation and a greatly shortened period of hospital treatment. In diphtheria, Musser's routine treatment is the administration of twenty thousand units of antidiphtheritic serum, one-half given intramuscularly and one-half into the peritoneum. In small children the doses are divided. In the local treatment of diphtheritic infections of the nose, ear or conjunctival sac irrigations of gentian violet are employed with good effect. Musser believes that neither vaccine nor any form of specific therapy has any influence upon the course of whooping cough, especially when the disease is well advanced. He has investigated the results following the use of ether in this disease and concludes that its intramuscular use causes severe pain and is liable to produce sloughing in the subcutaneous tissues. Injected into the rectum, however (ten cubic centimetres in oil), every eight hours, it would seem to control the severe paroxysmal cough. The treatment of tuberculous meningitis offers insurmountable difficulties and most patients die. It is supposed that the tubercle bacillus is extremely susceptible to the action of oxygen and several patients have therefore been treated by the daily injection of fifteen cubic centimetres of the gas into the spinal canal, accompanied by the daily drainage of the products of the disease. In the patients to whom the oxygen was given, there seem to have been definite signs of improvement. In cases of pneumococcal meningitis lavage of the spinal canal with combined cisternal lumbar puncture, followed by the injection of polyvalent antipneumococcic serum, seems to have brought about an improvement. The injection of "convalescent" serum into patients suffering from measles is a measure of great efficacy. The rash promptly disappears and all symptoms are at once relieved. To secure supplies of serum for purposes of treatment all convalescents should be bled before leaving hospital, the serum decanted and 0·5% tricresol added to it as a preservative. There can be no doubt as to the value of the antistreptococcic serum, prepared according to Birkhaug's directions, in the treatment of erysipelas. It has been proved time and again to cause a prompt drop in temperature and rapid amelioration of symptoms.

Diphtheria Toxoid.

J. G. FITZGERALD (*Annals of Clinical Medicine*, March, 1927) discusses the use of diphtheria toxoid is an immunizing agent. Diphtheria toxin treated with formalin is called toxoid; this is slightly toxic, whereas toxin treated with formalin and heat loses its toxicity, but retains its antigenic power. Toxin-antitoxin mixtures have been used in the United States of America to prevent diphtheria and many children have subsequently failed to react to the Schick test after three doses, but there are difficulties in estimating the antigenic power of toxin-antitoxin. This power is readily tested with toxoid by injecting toxoid into guinea pigs in increasing doses and later injecting five minimum lethal doses of diphtheria toxin. If the strength of toxoid used is suitable, four out of five guinea pigs tested should survive. Fitzgerald used diphtheria toxin, containing four hundred minimum lethal doses per cubic centimetre, 0·3% formalin was added and the mixture heated at 37° C. for one to four weeks until detoxication was complete. This toxoid was tested for strength by injection into guinea pigs as mentioned above. The power of this toxoid to produce antitoxin in guinea pigs being determined, human beings were injected with 0·25 and 0·5 cubic centimetre of toxoid, with good results in producing failure to react to the Schick test. Some 150,000 persons in Canada have received toxoid injections to date. More than 70% developed immunity in three months, but the duration of immunity is as yet unknown. Toxoid gave rise to local or general reactions in some cases; these susceptible persons can be detected by injecting intradermally 0·1 cubic centimetre of a one in twenty dilution of toxoid. If a reaction developes within three days and if the area affected is more than 1·25 cubic-centimetres (half an inch) in diameter, diphtheria toxoid should not be given. Toxoid appears to be preferable to toxin-antitoxin as an immunizing agent. Vaccination against diphtheria should be practised in the first six or eight years of life.

Treatment of Hæmophilia.

R. V. CHRISTIE AND G. L. GULLAND (*The Quarterly Journal of Medicine*, July, 1927) state that if it be assumed that there is a deficiency of prothrombin in hæmophilia, blood clotting can be hastened by introducing prothrombin, by adding other coagulative elements or by using some foreign substance in the hope of stimulating coagulation. The first method was employed by the authors in direct transfusion of blood and citrated blood transfusion with definite clinical benefit and improvement in the coagulation curve lasting five to seven days. Human serum, sheeps' serum and horse serum, used intravenously and subcutaneously, produced no improvement. "Hæmostatic serum" (Lapenta) or hæmoplastin was tried in three cases. It caused dangerous symptoms when given intravenously and did no good. Experimentally it was found that 10% of hæmoplastin was necessary to cause clotting *in vitro*, therefore two to four cubic centimetres in the four to six litres of circulating blood, equal to 0·1% at most, could not be expected to hasten coagulation. Tissue fibrinogen ("Fibrogen"-Merrell) given intravenously, is a lethal preparation, as it may cause intravenous clotting with instant death. Given by mouth and subcutaneously in two cases it caused no improvement, but induced a definite local reaction with involvement of glands in one instance. Prolonged administration of calcium lactate in four cases gave no good result. Intravenous injection of 0·6 gramme of sodium citrate in twenty cubic centimetres of distilled water (nine to sixteeen injections) causes a slight increase in coagulability of blood and the patients stated that they noted an improvement, but this was not considered to be definitely due to the injections. Peptone given intravenously, protein shock and thymus extract, gelatine, adrenalin, turpentine, perchloride of iron and other styptics have been tried without success. Local application of fresh human blood in cotton wool after all useless clots had been removed, was found the best local treatment.

Sodium Tetraiodophenolphthalein.

C. K. HSIEH (*Annals of Clinical Medicine*, August, 1927) records the effects produced by intravenous and oral doses of sodium tetraiodophenolphthalein in dogs. Thirty-one dogs were studied and three were used as controls. When given either orally or intravenously 0·2 to 1·0 gramme per 4·5 kilograms (3·3 to 16·0 grains per ten pounds) causes slight apparent fatty change and congestion scarcely in excess of the normal. This indicates that the dose used for human beings in Graham's test is under the toxic limit. With larger doses definite degenerative changes were found in liver, spleen, kidneys and heart. Fatty degenerative infiltration was the most pronounced change and this had progressed to extensive necrosis in one instance. These effects of overdose indicate the necessity for care in administration of this drug.

NEUROLOGY.

Somnolence and Cerebral Tumour.

C. A. MCKENDREE AND L. FEINER (*Archives of Neurology and Psychiatry*, January, 1927) state that somnolence may arise in cases of cerebral tumour apart from any anatomical situation in particular and before

definite signs of increased intracranial pressure appear and it may arise without obvious changes in the ventricles or hyperplasia of the involved region. But somnolence is most frequently present when there is internal hydrocephalus and yet the degree is often slight in comparison with other cases in which there is little or no ventricular distension. Their conclusion is that since the majority of their patients showed unequivocal signs of increased intracranial pressure, therefore this factor with or without ventricular distension operates directly or indirectly in retarding cerebral circulation, reducing conscious receptivity of surrounding stimuli and producing somnolence.

Subcortical Epilepsy.

WILLIAM G. SPILLER (*Brain*, June, 1927) considers the term subcortical epilepsy most suitable for the brief epileptic motor attacks called by Knapp "spastic epilepsy," by Sterling "extrapyramidal epilepsy" and by Wimmer "striate epilepsy." He describes two cases in which prominent symptoms were brief tonic spasms of both hands and one lower limb in one case and of one upper and one lower limb on the same side in the other. These spasms, devoid of any clonic element, were brought on by voluntary movement of the affected limbs in both cases, but in one case could be produced by passive movement. In both cases they were associated with paræsthesia predominantly of a hot or burning nature in the lower limb unaffected by spasm, appearing and disappearing simultaneously with the spasms of the other lower limb. In one case there arose paralysis of the ocular sympathetic on the side of the spasms. The literature on this variety of epilepsy is reviewed and reasons are given for assuming that the provocative lesion may lie in the subthalamic or striate region.

Psychiatric Examination of Persons Accused of Crime.

SHELDON GLUECK (*Mental Hygiene*, April, 1927) describes the measure passed several years ago by the Commonwealth of Massachusetts, said to constitute the most radical step yet taken to provide for the mental examination of accused persons awaiting trial for a capital offence. The law prescribes that the offender shall be examined by the State Department of Mental Diseases—a neutral, unbiassed, expert agency. Advantages claimed are that the mentally unsound may be spared the ordeal of a trial; the State and its officers may be saved the expenditure of time, effort and money in prosecuting those who ought not to be tried; and the public may gain by the restraint of so-called "defective delinquents" discovered early in their careers. Examination of two hundred and ninety-five persons accused of capital offences revealed twenty-six instances of insanity (definite major psychosis), eleven of psychopathic personality and twenty-five of mental deficiency or defective delinquency. In addition to this legislation dealing with capital offenders it is proposed to provide for the psychiatric and social investigation of inmates of gaols who are serving short sentences.

Painless Tumours of the Spinal Cord.

LAPORTE, RISER AND SOREL (*Revue Neurologique*, August, 1927) indicate that while the majority of tumours of the spinal cord, intradural or extradural, are attended by pain, a certain number are painless throughout the whole period of their growth which may be long and are difficult to diagnose if the "Lipoidol" test be omitted. To explain the freedom from pain in such cases it has been suggested that the tumours must be soft and vascular, but this is incorrect. Painless tumours of firm consistence have been found and on the other hand infiltrating soft sarcomata have been exceedingly painful. The writers emphasize several points. They hold as a general rule that the pure neuroma, even that arising in a posterior root, is the least painful of spinal tumours, whereas the infiltrating tumour, illustrated by the sarcoma, is the most painful. Relation to posterior roots, however, is of fundamental importance. A tumour may be of considerable size and exert pronounced pressure effects, but provided it be not sarcomatous and especially provided it be so fixed as not to drag upon roots, it will be painless; on the contrary, a mobile tumour appended to roots or sliding upon the cord will be painful and in such case pain will arise with each displacement of the spinal fluid, as may be proved by the intraspinal injection of air.

Cerebral Cysticercosis.

GEORGES GUILLAIN, J. PERISSON, I. BERTRAND AND P. SCHMITE (*Revue Neurologique*, November, 1927) record the history of a man, fifty-one years of age, who referred his trouble two years back, but who really became affected some twenty-five years earlier, by attacks of generalized epilepsy which recurred over a period of twelve years. Later these subsided and his health was such that he was able to serve in the great war. Finally he broke down as follows. His mood showed extraordinary variations. Mostly he would be sad, silent and easily moved to tears. But at times his sadness would be replaced by exuberant gaiety, at others by apathy, indifference and torpor. In addition he manifested profound disorientation in regard to space and time. In the streets he lost himself, in hospital he could not find his own bed. He could not give the day of the week, nor time past events which he certainly should have been able to do. But when his mistakes were explained, he recognized and attempted to correct them. His defect seemed to consist mainly of faulty concentration and attention. He was neither aphasic nor apraxic and ordinary neurological examination disclosed no important anomalies. But his discs manifested a degree of papillœdema, his cerebrospinal fluid contained 160 cells per cubic millimetre and K ray examination of the skull revealed areas of decalcification the size of a cherry at the vault and base. At the autopsy internal hydrocephalus and flattened convolutions were found and at the base was a meningitis having a gummatous appearance and here and elsewhere the microscope revealed typical vesicles of the parasite *Cysticercus racemosus*. Points of interest in the case were the slow evolution, the curious mental phenomena and the impossibility of clinical diagnosis.

Clinical Analysis of an Extrapyramidal Syndrome.

A. W. YOUNG (*Journal of Neurology and Psychopathology*, July, 1927) writes that the extrapyramidal system is a complex system to lesions of which authors have ascribed different clinical conditions; some of these ascriptions have stood the test of time, others have fallen by the way. The commonest affection of the system is *paralysis agitans* which has for its pathological basis lesions confined mainly to the *corpus striatum* and its efferent connexions. Postencephalitic Parkinsonism is another. The writer has analysed eleven cases of the former and thirty-nine of the latter. The conclusions are as follows: In testing the synergic action of muscle groups in Parkinsonism, no departure from normal, physiological law is to be found. In all cases without exception there is no interference with the appropriate interaction of protagonist, antagonist and synergist. So far from associated movements being absent in the Parkinsonian state, the reverse is the case. Not only are normally combined movements carried out just as in health, but some associated movements are present which are not seen in the normal individual. The views of striatal function based on the argument that associated movements are lost in Parkinsonian states, are vitiated at the outset. For example, the contention that the feet do not move when the patient rises to a standing from a sitting position, is based on erroneous observation. Absence of arm-swinging in walking is the one "associated movement" which is nearly always absent, but this is due to concomitant rigidity.

Protein Therapy in General Paralysis.

W. B. JENNINGS (*Medical Journal and Record*, June 15, 1927) follows Kunde in the treatment of general paralysis and recommends intravenous injections of typhoid vaccine. Beginning with a dose of two hundred and fifty to three hundred million bacilli, each following dose is increased according to tolerance until twelve to fourteen injections have been given. Such treatment is held to be as beneficial as the malarial treatment and to be free from danger.

Special Abstract.

THE PARATHYREOID GLANDS.

A GREAT amount of work has been carried out in recent years on the parathyreoid glands. Isolated references have been made in this journal to the part which they play in the metabolism of the body and to the therapeutic use of parathyreoid extract. It is feared that one result of these isolated references may be the formation of nebulous or even incorrect ideas in the minds of many medical practitioners on this important subject. In these circumstances a review of present day knowledge of these glands may serve the double purpose of giving information as to what has been done and of correcting false impressions.

A review of the physiology of the parathyreoid gland has recently been published by Lester R. Dragstedt.[1] The subject is a large one and the author refers to earlier work only as it bears on the current problem.

Anatomy of the Parathyreoid Glands.

The parathyreoid glands are developed from dorso-cranial thickenings of the epithelium of the third and fourth branchial pouches in the embryo in mammals and therefore are often intimately associated with the thymus which arises from the ventral outgrowths of these same structures. Commonly there are four glands. Two are closely associated with each thyreoid lobe and a varying number of islands or nodules of accessory parathyreoid tissue are found in the connective tissue surrounding the thyreoid in the thymus, in the connective tissue, in the anterior mediastinum and along the trachea, arch of the aorta or pulmonary artery. They are made up of strands of epithelial cells supported by a reticulum of endothelial cells of varying size and shape and enclosed by a connective tissue capsule. Often there is no definite columnar arrangement, the cells appearing in masses or clumps; but sometimes there is follicle formation containing colloid, the significance of which is unknown. This colloid, however, has no relation to the colloid of the thyreoid, it is entirely uninfluenced by factors which alter the latter. The parathyreoids contain no more iodine than is found in organs such as the ovary, pituitary or thymus. The parenchyma consists of moderately large polygonal cells with deeply stained nuclei and poorly staining cytoplasm, these are the chief cells. There is also a smaller number of slightly smaller cells with granular deeply staining cytoplasm and small central nuclei, these are the chromophile cells. Tomaszewski found a proportionate increase in the chromophile cells in cases in which he found abnormal deposits of calcium in arterial walls, cartilages of the ribs, lymphatic glands and so forth; he ascribed this increase to hyperactivity of the parathyreoids. A similar abnormal deposition of calcium has been observed following the excessive administration of active parathyreoid extracts to dogs. In pregnancy there is constantly found hypertrophy of the parathyreoid together with a proportionate increase in the chromophile cells and increased vascularity. Nerves have been described accompanying the blood vessels through the parathyreoids, but their function is unknown. Transplantation experiments have shown that the parathyreoid glands can function adequately in the absence of all nerve connexions.

Acute Effects of Extirpation of the Parathyreoid Gland.

A great deal of the knowledge of the function of the parathyreoid gland has been derived from studies of the clinical symptoms and the metabolic disturbance which have been found to take place upon their partial or complete extirpation in man and in laboratory animals. It is probable that the metabolic disturbance is essentially the same in all species and that the variations in the symptom complex observed in different animals are dependent upon other and minor factors. When the parathyreoid glands of an animal are removed, a characteristic symptom complex, known as parathyreoid tetany, results. This symptom complex need not be described in detail. It is characterized mainly by fibrillary contractions of the muscles and these are succeeded by more coarse irregular contractions and a gradually developing spasticity. When death takes place, it is usually produced by the asphyxia resulting from the long continued spastic contraction of the larynx and of the muscles of respiration. The parathyreoid glands are necessary for life. An acute parathyreoid insufficiency is much more liable to cause death than one of equal degree gradually produced. Age is likewise a significant factor. Young animals are much more susceptible to parathyreoid deficiency than adults and aged animals are more resistent. Animals that are fed largely or exclusively on meat, develope tetany and die sooner after parathyreoidectomy than those who have been given a meat free diet or who have been starved. Animals with active rickets are likewise more susceptible to parathyreoid deficiency than normal animals. Acute parathyreoid tetany can be repeatedly relieved and controlled by measures such as the intravenous injection of Ringer's solution, a milk and lactose diet and by other measures which do not involve the administration of any specific product of the parathyreoid. So far as is known the continued application of these methods will permit a dog and possibly other animals to survive as complete a parathyreoid deficiency as can be experimentally produced. It is accordingly evident that the parathyreoid glands do not perform a specific function in metabolism which is indispensable for life. It is not known whether the procedures which enable a dog, deprived of its gland, to survive acute tetany will also compensate for the more gradual chronic disturbances which result from deficiency of parathyreoid function.

The most constant as well as the earliest change to be observed after parathyreoid extirpation is the increased excitability of the peripheral nerves to electrical and to a loss extent to mechanical stimulation. This increased excitability is due to a direct effect of the blood on the peripheral nerve; there is little evidence of increased excitability in the sympathetic system. The tremors and jerkings are due to action on the spinal cord and apparently on the efferent arc, since they may develope after section of the dorsal roots. The tonic and clonic convulsions appear to be due to an effect on the cerebellum or midbrain which does not proceed *pari passu* with the increase in excitability of the peripheral nerve.

In parathyreoid tetany there are symptoms of more or less severe gastro-intestinal disorder. When parathyreoid tetany is prevented by calcium administration, the introduction of Ringer's solution or a milk and lactose diet, digestion, absorption and motility are normal. The disturbances in the digestive tract are therefore an effect of the tetany and are not directly due to a decrease in the amount of parathyreoid hormone liberated in the blood.

The Blood after Parathyreoid Extirpation.

Dragstedt points out that the literature dealing with the changes occurring in the blood following the removal of the parathyreoid and coincident with the development of tetany, is large and conflicting. The fall in the concentration of serum calcium from a normal of ten to twelve milligrammes per hundred cubic centimetres to one varying between eight and six or five milligrammes during the first two or three days is well established. A decrease in the proportion of free or ionized calcium has been reported by some investigators. Although an increase in the organic phosphorus of the blood occurs, it is inconstant and varies in amount. It is possible that in some instances the changes observed may have been due to kidney injury or to ether anæsthesia. The decrease in the excretion of phosphorus, however, is consistent and it seems probable that the retained phosphorus is deposited in the tissues. The views of some authors that a condition of alkalosis occurs after parathyreoidectomy is contradicted by the findings of a number of later investigators. Greenwald has shown that the titratable alkali of the blood remains unchanged. However, a slight alkalosis

[1] "Physiological Reviews," October, 1927.

may occur in a dog whose parathyreoid tetany is characterized by hyperpnœa; it is due to removal of carbon dioxide. It is not improbable that this hyperpnœa may be an exciting factor in the tetany. In regard to hypoglycæmia after thyreo-parathyreoidectomy, the coagulability of the blood and the increase in non-protein nitrogen of the blood the opinions of many workers are at variance.

Physiological Effect of the Parathyreoid Hormone.

The first convincing demonstration of a physiologically active parathyreoid extract, capable of affording successful substitution therapy and of raising the concentration of blood calcium, was made by Collip in 1925 and with this came the first proof that the parathyreoids perform their function by means of an internal secretion. Extracts of the fresh parathyreoid of animals, made with weak acid, regularly contain varying amounts of the hormone. The hormone is a moderately stable substance, apparently a protein derivative or a substance intimately associated with the protein fraction. When administered subcutaneously or intravenously in dogs, it prevents the appearance of tetany after parathyreoidectomy or relieves tetany after its appearance and by its continued use the life of such animals may be preserved from three to six weeks; after this time they continue to live without treatment. When it is given to dogs in active tetany, the symptoms are relieved and the lowered serum calcium level is raised and the concentration of inorganic phosphorus in the blood is decreased, if it is above the normal level. The hormone also increases the concentration of serum in normal animals, the degree of hyperglycæmia being directly proportional to the amount of hormone given.

It is not clear how the parathyreoid hormone produces its characteristic effect on the blood calcium. There seems to be a direct quantitative relation between the amount of hormone liberated in the blood stream and the concentration of the blood calcium. Presumably under normal conditions the amount liberated suffices to keep the level constant, in spite of such variable factors as absorption from the alimentary tract and excretion and withdrawal in special conditions such as pregnancy and lactation. Dragstedt refers to the observation of Holt, La Mer and Chown that the quantity of calcium in the serum is greater than an aqueous solution of the same reaction and phosphate content could keep in solution. He points out that the suggestion of Greenwald that the parathyreoid hormone acts through keeping the calcium in solution is questioned by the fact that the serum calcium in dogs, completely deprived of their parathyreoid glands, may be raised to the normal level by the oral administration of calcium salts. The large amount of calcium required for this purpose points to a defective absorption of this element as an important result of parathyreoid deficiency. This defective absorption is in part remedied by parathyreoid administration, since the combined administration of parathyreoid extract and of calcium lactate by mouth is more effective in raising the blood calcium level than either measure alone. The lessened deposition of calcium in osteoid tissue may be directly due to the diminished concentration of calcium in the blood or to a loss of function of the osteogenetic cells. The removal of calcium phosphate from the bones when excessive doses of the parathyreoid hormone are given and when sufficient calcium is not present in the diet, indicates a stimulation of the osteoclasts or other cells which are concerned in the removal of calcium from bone.

Parathyreoid Insufficiency and Latent Tetany.

The removal of two of the four parathyreoid glands from the dog, cat or rabbit produces no nervous symptoms nor any changes in the blood. The extirpation of three glands, however, often causes transitory symptoms of more or less severe tetany and the serum calcium may fall to seven milligrammes per hundred cubic centimetres. The animal may thereafter remain free from tetany, except under certain special conditions. The remaining parathyreoid tissue undergoes a compensatory hypertrophy. If the four glands of a dog be removed and if the resulting tetany be controlled by one of the methods to which reference has previously been made, the animal may after a period of four to eight weeks remain alive and free from tetany without treatment. The level of the serum calcium remains lower than normal and various chronic disturbances develope. Animals which are the subject of experiment and which suffer from chronic parathyreoid deficiency, may develope acute, often fatal, attacks of tetany under a variety of conditions. Œstrus will regularly precipitate a more or less severe tetany in dogs. Similarly acute tetany frequently occurs at each menstruation in women with latent tetany due to parathyreoid insufficiency. The phenomena appear to be analagous. The mechanism of this œstrual tetany is not clear. Dragstedt mentions various possible ways in which it could be caused, and concludes that the evidence suggests that there is an antagonistic influence of the ovaries and parathyreoids on some phase of metabolism.

Pregnancy not only increases the severity of the tetany and shortens the life of dogs whose parathyreoids have recently been removed, but it regularly transforms a latent into an active and often fatal tetany. The hypertrophy and hyperplasia of the parathyreoids during pregnancy is similar to that produced by diets deficient in calcium. It is evident that pregnancy produces an unusual abstraction of calcium and, if the intake is deficient, the mother loses body calcium, as is shown by the results of calcium analyses and skiagrams in the rat. The calcium content of the fœtus is normal. There is no evidence, however, even when the diet is low in calcium, that pregnancy lowers the concentration of that element in the blood. The calcium concentration of the blood of normal women in early and late pregnancy is not different from that of non-pregnant women of the same age. It is possible that the mechanism for maintaining a constant level of serum calcium which would compensate for the specific removal in pregnancy, is defective after partial or complete parathyreoidectomy.

Lactation is a more effective stimulus than either œstrus or pregnancy in producing an acute exacerbation of tetany in a dog with chronic parathyreoid deficiency. The severity of the tetany is to some extent directly proportionate to the amount of milk withdrawn. This tetany can be entirely relieved and controlled by the intravenous injection of Ringer's solution or the oral administration of calcium lactate. There is no evidence that the serum calcium of normal animals is reduced by lactation.

Other factors which may precipitate an acute attack of tetany in animals in which it is latent are: muscular exertion, the administration of certain toxic substances such as atropine, morphine, ergot, tuberculin, phosphorus, guanidine and methyl-guanidine, meat feeding, constipation, high temperatures, gastro-intestinal irritants such as sulphur, *cascara sagrada* and croton oil, infections and possibly many others.

The Parathyreoid Glands and Calcium Metabolism.

It is clearly established that the parathyreoid glands play an important rôle in the maintenance of the normal level of blood calcium and probably in the transfer of calcium from the alimentary tract and its deposition in the osteoid tissues during growth or repair. This function is performed through the agency of an internal secretion. Dragstedt summarizes the evidence for these statements under several headings. The main points in his summary are as follows:

1. The partial or complete absence of parathyreoid function results in a diminution in the concentration of calcium salts in the blood.

2. The partial or complete absence of parathyreoid function causes a lessened excretion of calcium from the body. This decreased excretion appears to be a direct result of the decrease in blood calcium and is not due to an impermeability of the intestine to calcium salts.

3. The partial or complete absence of parathyreoid function causes a lessened deposition of calcium in the osteoid tissues during periods of growth or repair.

4. Experimental conditions which bring about a decreased supply of available calcium to the organism, are found to produce an hypertrophy and hyperplasia of the parathyreoid glands. It is probable that this is a compensatory hypertrophy to meet the need of the organism for more parathyreoid hormone.

5. Certain diseases characterized chiefly by a disturbance or failure in the normal calcification of bone, are likewise characterized by a resultant hypertrophy of the parathyreoids. Thus hypertrophy of the parathyreoids has been observed in rickets, in osteomalacia, in senile osteoporosis, in *osteitis fibrosa*, in *osteitis deformans*, in von Recklinghausen's multiple fibrocystic disease of bone and perhaps others. In no case has it been demonstrated that the disorder has been caused by hypertrophy or hyperfunction of the parathyreoids. On the other hand, although these diseases are for the most part of uncertain ætiology, it is probable that the observed changes in the parathyreoids are produced by the disease or by the alteration in the calcium metabolism which results from the disease.

6. The administration of calcium salts to animals in which a characteristic disease syndrome (parathyreoid tetany or depression) has been produced by absence of parathyreoid function, to a very large extent corrects this disturbance.

7. The administration of a physiologically active extract of the parathyreoids to animals deprived of their parathyreoid glands raises the blood calcium to its normal level and excessive doses to these or to normal animals raises the blood calcium to abnormally high values.

The Pathogenesis of Parathyreoid Tetany.

It is clear that the hyperirritable state of the peripheral nerves and probably also the convulsive phenomena, attributed to stimulation of the midbrain, cerebellum and spinal cord, are in turn due to an alteration in the blood and lymph. This is indicated by the fact that hyperirritability can develope in peripheral nerves that have previously been sectioned. The perfusion of blood from a dog in active tetany through the isolated extremity of a normal dog produces an increased electrical excitability of the peripheral nerves in the perfused leg. Dragstedt discusses two of the explanations which have been offered in regard to the nature of the alteration in the blood. These are the calcium deficiency theory and the intoxication theory. He does this in a clear and concise way, but does not indicate definitely which of the two he favours. As the article is a review of the present day knowledge this is not surprising, but as he has done so much work on the subject, it would have been interesting to read what his opinions are.

The Calcium Deficiency Theory.

MacCallum and his associates attempted to attribute the hyperirritability of the nervous system in parathyreoid tetany to a relative decrease in the concentration of calcium in the circulating blood. There is a great deal of evidence to support this view. The irritability of isolated muscle and nerve suspended in various balanced physiological salt solutions may be increased by lowering the concentration of calcium in proportion to that of sodium in these mixtures. When tetany follows thyreo-parathyreoidectomy, the serum calcium is reduced and the extent of lowering corresponds roughly with the degree of severity of the tetany in animals recently operated on. The inactivation of the circulating calcium in normal animals by the intravenous injection of sodium citrate, oxalic acid or sodium oxalate is accompanied by muscular twitchings and convulsions similar to those of tetany and these may be relieved by the injection of soluble calcium salts in sufficient quantity to restore the equilibrium. The perfusion of blood from a dog in active tetany into the isolated leg of a normal dog increases the electrical excitability of the nerve in the perfused leg and a similar effect may be obtained by perfusing normal blood from which the calcium has been partly removed by dialysis. The intravenous introduction of certain soluble calcium salts relieves for a time all the signs and symptoms of tetany and the administration of an active preparation of the parathyreoid relieves parathyreoid tetany and effects a simultaneous proportionate elevation of the blood calcium. Excessive amounts of this preparation increase the serum calcium above the normal concentration and bring about symptoms of weakness and depression which are in some respects the antithesis to those of tetany.

Dragstedt points out that these facts would appear well nigh conclusive in proving that parathyreoid tetany is due to the diminished blood calcium, were it not for certain observations which at present are not capable of ready explanation on this basis. The withdrawal of blood from a dog in violent tetany and the substitution of an equivalent amount of a physiological salt solution free from a calcium affords a distinct, although temporary, relief. However, bleeding alone causes a relief, but this is accompanied by an increase in the serum calcium. The intravenous injection of Ringer's solution causes a complete relief of tetany and when repeatedly applied, a permanent control. This relief is not, however, accompanied regularly by a return of the lowered blood calcium to its normal level. A similar relief may be obtained by intravenous injections of calcium-free Ringer's solution or of a modified Ringer's solution in which strontium has been substituted for calcium. It is probable that many of the procedures that may cause a temporary relief of tetany, and that may preserve the life of animals deprived of their parathyreoid, act through a depressant effect on the nervous system and do not elevate the blood calcium. This appears to be the case in the treatment of tetany with chloride of magnesia, morphine sulphate and possibly with strontium salts. It does not follow from this that the lowered calcium is not the causative factor in tetany, since its irritant effect may be counterbalanced by the depression induced. When the method of tetany control is relaxed after complete parathyreoidectomy, tetany may occur from time to time and the serum calcium be higher during the period of tetany than at others when the animal is free from symptoms. After four or five months the animal may remain entirely free from tetany with a serum calcium level as low as five or even four milligrammes per hundred cubic centimetres. At the same time a severe or fatal attack may be induced by œstrus, pregnancy or lactation. The effect of pregnancy and lactation may be explained by the withdrawal of maternal calcium and the failure of an adequate compensatory mechanism in the absence of parathyreoid function. The effect of œstrus and menstruation is not so readily understood. It is in regard to the alimentary tract that the situation seems particularly confusing. Meat feeding, constipation and gastro-intestinal irritation may provoke severe tetany in susceptible animals. Conversely meat-free diets, containing lactose, galactose or even kaolin, may entirely prevent parathyreoid tetany. It is thus evident that there must be something in meat or produced by meat ingestion which induces tetany. The difference between the calcium content of the two diets is not great enough to account for the effect of meat feeding on this basis. It is more probable that on the meat diet some substance is absorbed which causes tetany, but whether this is a phosphate which lowers the blood calcium, a nitrogenous compound which lowers the proportion of ionized calcium in the blood, or a toxin which provokes tetany in a susceptible animal, is not known.

The Intoxication Theory.

In discussing the intoxication theory, Dragstedt points out that it is difficult to account for the great variation in symptoms displayed by different species and by different animals of the same species after thyreo-parathyreoidectomy, solely on the basis of a lowered blood calcium. Much of the evidence in favour of an intoxication theory is indirect. The relief and control of parathyreoid tetany by the injection of various salt solutions may be attributed to the dilution and rapid removal by diuresis of a soluble tetany poison from the blood stream.

The prevention of parathyreoid tetany and the preservation of life of dogs deprived of their parathyreoid by meat-free diets together with lactose or galactose and milk may be attributed to the lack of production of tetany poison in the alimentary tract when bacterial proteolysis is checked. The effect of kaolin may be explained as due to the prevention of absorption of the tetany poison because of the adsorbent effect of the kaolin on the toxin. The aggravating effect of meat feeding, putrid meat, constipation and gastro-intestinal irritation on animals which are the subject of latent tetany, may be attributed to an increased production and absorption of tetany toxins from the alimentary tract under these conditions. Attempts to secure direct evidence of the presence of the toxæmia after parathyreoidectomy have not been very successful. Both the urine and blood of dogs with active parathyreoid tetany have been reported to contain increased amounts of such substances as guanidine, but the chemical methods available for the determination of guanidine in blood and urine are not satisfactory. The administration of guanidine and methyl-guanidine to normal animals produces a symptom complex very much like that of parathyreoid tetany. While most recent observers are agreed that parathyreoid tetany is regularly accompanied by a fall in the concentration of the blood calcium, the evidence in regard to this point in guanidine intoxication is conflicting and it seems probable that a decrease comparable to that seen in tetany does not occur. Bayer reported a decrease in the ionized calcium in the serum of animals poisoned by guanidine, but the decrease was not so great as in parathyreoid tetany; other observers, using chemical methods for the estimation of the total serum calcium, found no decrease in normal animals poisoned with guanidine. Dragstedt and Sudan found that dogs which had been kept alive after thyreo-parathyreoidectomy by treatment, and which were free from tetany although the blood calcium was lower than normal, did not suffer a further decrease on being poisoned with guanidine. The evidence on the effect of calcium administration in guanidine poisoning is likewise contradictory. While the ameliorating effect of calcium on parathyreoid tetany is easily demonstrated, a comparable effect on guanidine poisoning is not found. Conversely the administration of an active parathyreoid extract does not protect dogs poisoned with guanidine.

British Medical Association News.

MEDICO-POLITICAL.

WE have been asked to publish the following letter that has been addressed to all medical practitioners who undertake friendly society lodge practice in Victoria.

For some considerable time it has been obvious that the formation of a section of the Victorian Branch of the British Medical Association devoted entirely to the interests of lodge surgeons is desirable.

Other sections of the profession have already been formed to deal with matters appertaining to their special interests. The eye and ear, neurological, orthopædic, public health, radiological, obstetrical and gynæcological sections of the British Medical Association are instances and the Medical and Pædiatric Societies and the new-formed College of Surgeons of Australasia are bodies formed outside the British Medical Association.

With the object of gathering all lodge surgeons together to discuss those subjects that affect contract practice, *exempli gratia*, the Wasley award, national insurance, certification, health centres, dispensaries *et cetera*, we, the undersigned, approached the Council of the Victorian Branch of the British Medical Association last year for permission to form a lodge medical officers' section of the Branch. This has been granted.

We therefore ask you to show an active interest in the work of the section, thus strengthening it and through it the whole work and organization of the Victorian Branch of the British Medical Association.

It is usual in all sections to name a small sum as membership fee for postage, printing *et cetera* and this has been fixed at 5s. *per annum*.

Will you please forward this sum to Dr. G. H. Guthridge, Somerville Road, Yarraville?

The first meeting to which you are hereby invited, will take place at the Medical Society Hall, Albert Street, East Melbourne, on Thursday, March 22, 1928, at 8.15 p.m., when Dr. D. Rosenberg, a member of the Council of the Victorian Branch, will address the section on (*a*) the Wasley award and the proposed common form of agreement for Australia, (*b*) the position in Queensland. Other business: Election of office-bearers for 1928.

Yours faithfully,

ATCHISON, R. D., Albert Park.
BENNETT, J. H., Hawthorn.
DAVIS, J. L., Richmond.
GRIFFITH, J. V., Footscray.
LEWIS, J. C., Coburg.
PESTELL, J. H., Brunswick.
ROBINSON, G. S., Williamstown.
ROSENBURG, D., Richmond.

Post-Graduate Work.

POST-GRADUATE COURSES IN MELBOURNE.

THE Melbourne Permanent Committee for Post-Graduate Work announces that the following courses will be held in Melbourne. The regular November course will not be held this year, but will be replaced by a course in August in order that it may coincide with the visit of Professor F. R. Fraser, of Saint Bartholomew's Hospital, with whom the Committee has made arrangements. Fuller details and exact dates will be published at a later date.

April 17 to July 3, 1928.—Post-graduate course in advanced physiology by Professor W. A. Osborne.
August 6 to 20, 1928.—Post-graduate refresher course; six lectures on medical subjects by Professor F. R. Fraser.
August 11 to 27, 1928.—Obstetric course with opportunities for those who participate to reside at the Women's Hospital.

It is suggested that an attempt will be made to continue the post-graduate teaching facilities throughout the month of August. Medical practitioners will be able to attend more than one course at one period.

Correspondence.

ADVERTISING.

SIR: Permit me to make a few comments upon your leading article entitled "Press Notices." I am convinced that medical men are rarely responsible for such notices. Newspaper reporters are always hunting for "copy" and if they consider that certain news about a medical man, either social or professional, is of public interest and they publish it, that is their affair, unless the published statements constitute slander or libel. Newspaper editors rightly consider that they are free agents in the matter and we must not and cannot interfere with the freedom of the press.

When I was in England I noticed that when Princess Mary had a baby or when any member of the Royal Family or other prominent person was ill, the names of the medical men in attendance were published in the news-

papers. Nobody blamed these men. If our Governor-General developed appendicitis, what harm would be done if the newspapers happened to mention the name of the surgeon who removed the offending structure? Even if a medical man who has distinguished himself in some way, were solemnly to warn his parents, brothers and sisters, aunts and cousins not to make it public in the newspapers, some journalistic friend or old school fellow would be certain to do so.

There is a lot of nonsense talked by people who condemn doctors for supposed arvertising. I have a shrewd suspicion that it is prompted mainly by professional jealousy and it is chiefly the older members of the profession who are jealous of the rapid progress made by younger men. Age must resign itself to a back seat as the years roll by. In this matter we must be guided by common sense. Our friends in the legal profession do not try to interfere with the freedom of the press. Newspapers publish freely the names of lawyers appearing for the plaintiff and for the defendant.

You say that there is a tendency to scoff at the idealism of the medical profession. Not at all! The aims and ideals of the profession are fully shared by the public. It is our little foibles that they scoff at, though few of them have the ability to satirize them as Bernard Shaw has done. It would do us good if we tried to see ourselves as others see us. It is not necessary for the public to consider advertising when they wish to discover whether a man is an orthodox practitioner or a charlatan. They know quite well the meaning of University degrees and they know the faith healer, the osteopath or the Chinese herbalist as such; but notwithstanding this they frequently visit these latter gentlemen in preference to ourselves. To us, of course, such a course of action is incomprehensible, but it is human nature. The law does not allow an unqualified person to treat patients and call himself "doctor," but for some obscure reason surgeons wish to be called "mister," even though they may have obtained the M.D. This curious custom undoes whatever good such a law might do. It puzzles lay people; but they dismiss it with a smile and the remark: "That's what they call medical etiquette."

You refer to the General Medical Council erasing the name of a medical practitioner from the register for advertising. Let me state quite definitely that there is nothing in the *Medical Act* to prevent a doctor from advertising if he wishes to do so. The Council of the British Medical Association could treat him as they thought fit, but the law could not force him to stop practising his profession. The recently formed Health Society in England, led by Arbuthnot Lane, is doing very good work. We must try to judge people fairly and not impute to them ulterior motives of which they are innocent. I believe that those men are making an honest attempt to educate the people on matters of health along scientific lines, as is being done in America.

Direct personal advertisement by medical men must be strongly condemned. It is ungentlemanly and (I trust I shall not be accused of snobbery) it puts a doctor on the same level as ordinary tradespeople. It is an attempt to take a short cut to a reputation which should be built up by good work and patient endeavour. This is such an important subject that I think you should allow members of the British Medical Association to express their opinions quite freely on the matter. By so doing you would render a service to the profession.

Yours, etc.,

"COMMON SENSE."

PATHOLOGICAL SERVICE.

SIR: I have been following the correspondence in your journal concerning the abuse of Government pathological services with great interest and agree with "Tanto Sospirero" that this abuse is only too real and grossly unjust. As a constant and grateful user of the services of private pathologists, it certainly has been my experience that "patients are given their money's worth and much more from private pathologists" and I also find these pathologists only too ready to make reductions in fees when dealing with patients of poor circumstances.

There is one condition of affairs as stated in "Tanto Sospirero's" letter which calls for a remedy. His statement, "apparently general practitioners, surgeons, physicians, radiographers and other specialists are loyal to each other in matters affecting *The Workers' Compensation Act* but the poor pathologist is forgotten," is only too true. I am afraid this disloyalty to the pathologists often extends beyond *The Workers' Compensation Act*.

The proper remedy, of course, is that the Board of Health should take adequate steps to prevent abuse of its services, but in the meantime practitioners could "be decent" and treat the pathologists as they would their other colleagues.

Yours, etc.,

O. A. DIETHELM.

"Craignish,"
185 Macquarie Street, Sydney.
March 13, 1928.

THE INTRODUCTION OF INTRATRACHEAL CATHETERS.

SIR: I read with great interest the article on the introduction of intratracheal catheters by Dr. A. B. Keith Watkins in THE MEDICAL JOURNAL OF AUSTRALIA of February 25, 1928.

In my own experience I have found the following procedure simple and readily acquired: A moderate depth of anæsthesia is used. The patient lies flat on his back and without altering the position of the head a mouth gag is inserted on his right side. The middle and under fingers of the right hand are placed in the pharynx. The middle finger then draws the epiglottis forward against the tongue. A Porge's catheter is pushed along the palmar aspect of the index finger. When the catheter reaches the tip of the index finger, this finger transfers the catheter to the middle finger which then presses the catheter against the epiglottis. With the left hand, the catheter is then slowly pushed onwards between the middle finger and epiglottis. The bend is a sharp one but by keeping the catheter pressed up against the epiglottis the correct direction is obtained and the catheter is pushed on for about another two inches.

In edentulous patients, in children and in old people it is usually possible to feel the arytenoid cartilages with the middle finger and then the introduction is simple. But an anæsthetist with short fingers or a patient with large incisor teeth or one who is only lightly anæsthetized it may be impossible to feel the arytenoid cartilages. And it is quite unnecessary. The catheter is kept pressed firmly against the epiglottis and gently pushed onwards. It then cannot go wrong.

If there is difficulty in reaching the epiglottis with the finger, then gently pull the tongue forward with tongue forceps and it will come within reach. The same thing applies to the long thin type of epiglottis. It is advisable to practice on a patient who has been anæsthetized for some time and thoroughly relaxed.

The introduction after a little practice becomes a matter of seconds. I think the anæsthetist should perform the catheterization, thereby saving the surgeon's time.

Indications of correct catheterization are: (i) The patient frequently coughs a little; (ii) there is a rush of air with inspiration and expiration. When in the œsophagus there is a bubbling sound and inspiration only is heard.

Yours, etc.,

M. SCHNEIDER.

Adelaide.
March 9, 1928.

LIVER DIET IN PERNINCIOUS ANÆMIA.

SIR: Those interested in the treatment of pernicious anæmia may have noticed that sheep's liver has not been recommended in the various dietaries prescribed. It is true

that Drs. Minot and Murphy and others writers mention "mammalian" liver, but only calf's and beef liver are specified. (Chicken liver is used occasionally, but of course is not in the same category and is not believed to be so efficacious.) I wrote to the "Committee on Pernicious Anæmia" of the Harvard Medical School about this and have just received the following reply from the Chairman:

> I have talked with Dr. Minot regarding the use of sheep's liver and his opinion is exactly what I had supposed it would be, namely, that in all probability it is as effective as calve's liver. The simple fact is that we have had no experience with it. In the United States, so far as I know, sheep's liver is not commonly eaten. I have certainly never heard of anyone eating sheep's liver. I cannot imagine, however, why it should not be quite as good as calve's liver.

I may add that I also received a letter from Messrs. Efi Lilly and Company's Research Laboratories to the effect that they were sending me a complimentary supply of the new Liver Extract No. 343., "with the joint compliments of the Committee on Pernicious Anemia of the Harvard Medical School and ourselves. . . . The therapeutic response in over one hundred cases of pernicious anemia has been uniformly spectacular. It will be put on the market shortly."

Yours, etc.,

J. W. SUTHERLAND.

Narromine.
March 5, 1928.

Medical Practice.

THE FLYING DOCTOR.

IN THE MEDICAL JOURNAL OF AUSTRALIA of November 12, 1927, an article was published in which the activities of the Australian Inland Mission were described and an outline was given of a scheme for an aerial medical service in the so-called Barkly tableland in north-west Queensland. This area is served by an admirable motor ambulance by the Queensland Ambulance Transport Brigade. The distances are very great between the centres and the Australian Inland Mission has done pioneer work in reducing the difficulties born of these enormous distances by introducing wireless communications. Arrangements have now been made with the Queensland and Northern Territory Aerial Service, otherwise known as "Qantas," to enable the Mission to supplement the means of communication by the establishment of an air service. All the preliminary work has been carried out without a hitch. The Australian Inland Mission has accepted the offer of Dr. K. St. Vincent Welch, of Sydney, to undertake the organization of the aerial medical service in this tableland district for a period of twelve months. Qantas has agreed to supply a pilot and an aeroplane to be stationed at Cloncurry. It is anticipated that at least twenty-five thousand miles will be covered during the first year. Surgical and medical aid will be brought to people living as much as four hundred miles from the nearest medical practitioner. In this way a sense of security will be given to settlers who have hitherto lived under the shadow of "what might happen." Generous support has been given to the movement by the Federal Government, the Graziers' Association and the McKay Trust. If the experiment proves a success, it is the intention of the Australian Inland Mission to cover a still wider area. The movement should prove of national value.

Obituary.

BASIL CARLYLE KENNEDY.

WE regret to announce the death of Dr. Basil Carlyle Kennedy which occurred at Sydney on March 14, 1928.

UNDULANT OR MALTA FEVER.

A MEMORANDUM has been issued by the members of the "Camera Medica" of Malta and of the Malta Branch of the British Medical Association in regard to the discontinuance of the use of the terms Mediterranean or Malta fever and the general adoption of the name undulant fever. They point out that a suitable and generally acceptable designation of this fever has long been the subject of discussion. It has been known by a variety of names. Thirteen different appellations have been given to it on account of its supposed resemblance to enteric fever or malaria; fourteen names have arisen on account of the character of the fever and the accompanying symptoms and nine were derived from the conditions which from time to time were considered to favour its prevalence. It has also been called after various places such as Malta, Italy, Naples, Gibraltar, Cyprus *et cetera*. The name undulant fever was originally proposed by M. L. Hughes in 1897 and was recommended by the International Congress of Medicine held in London in 1913. It is generally used by the English writers, but the names Malta or Mediterranean are still frequently seen.

The term "undulant," though not perfect, is held to be the most suitable designation of this disease in the present circumstances. One of the most constant and characteristic features of the disease is the undulations in the temperature curve. The fever constitutes the primary and in many cases the only clinical manifestation of the illness. Although the temperature curve may not always be of the undulant type, yet the phenomenon is sufficiently frequent and typical to justify the adoption of the term undulant as one which would convey to anyone the principal clinical feature of the disease. As a parallel it is pointed out that the term typhoid fever is commonly used for a disease in which the typhoid state is a frequent, but not a constant symptom. Moreover, the term relapsing fever is derived solely from the variations in the temperature. The term undulant fever has so far been used only for this disease and cannot therefore give rise to ambiguity and does not offer the same drawbacks as the terms "remittent" and "intermittent."

The authors of the memorandum do not discuss the specific microorganism of undulant fever, as the whole question of bacteriological nomenclature is to be considered at an international botanical congress to be held shortly. They conclude with an appeal to the members of the medical and allied professions to abandon the use of a term which is prejudicial to the "moral and material interests of the island of Malta."

CHILDREN PATIENTS IN HOSPITAL.

Dr. S. W. G. Ratcliff, the Medical Superintendent of the Royal Alexandra Hospital for Children, Sydney, wishes to inform medical practitioners who refer patients to the hospital, that a statement of the final diagnosis will be sent to them if required. A full clinical report can be obtained on payment of a small fee to cover the cost of secretarial work.

FOUND: THE SLIDING TOP OF AN OPERATING TABLE.

WE are in receipt of a letter from Mr. W. H. Jackson, of 46, French's Road, Willoughby, North Sydney, in which he states that about three weeks ago he found in French's Road, the sliding top of a Hartley-Murray Verdi operating table. This had dropped out of a motor lorry as it was travelling over the bumpy road. Mr. Jackson has gone to a good deal of trouble first of all in finding out what the article was and secondly in communicating with us. The owner is asked to write either to Mr. Jackson or to Mr. Heyde, Operating Theatre, Sydney Hospital.

Books Received.

TREATMENT BY MANIPULATION: A PRACTICAL HANDBOOK FOR THE PRACTITIONER AND STUDENT, by A. G. Timbrell Fisher, M.C., F.R.C.S. (England); 1928. London: H. K. Lewis and Company, Limited. Demy 8vo., pp. 212, with illustrations. Price: 9s. net.

EXPERIMENTAL PHYSIOLOGY, by Sir Edward Sharpey-Schafer, F.R.S.; Fourth Edition; 1927. London: Longmans, Green and Company. Demy 8vo., pp. 147, with illustrations. Price: 6s. net.

SELECTED PAPERS ON INJURIES AND DISEASES OF BONE, by Sir William Ireland de C. Wheeler, (Mod.) B.A., M.D. (Dublin), F.R.C.S.I., F.A.C.S. (Hon.); 1928. London: Baillière, Tindall and Cox. Demy 8vo., pp. 168, with illustrations. Price: 10s. 6d. net.

Diary for the Month.

MAR. 27.—New South Wales Branch, B.M.A.: Council.
MAR. 28.—Victorian Branch, B.M.A.: Council.
MAR. 29.—New South Wales Branch, B.M.A.: Branch (Annual).
MAR. 29.—South Australian Branch, B.M.A.: Branch.
APRIL 3.—New South Wales Branch, B.M.A.: Council (Election of Officers and Standing Committees).
APRIL 3.—Tasmanian Branch, B.M.A.: Council.
APRIL 4.—Federal Committee of the B.M.A.: Australia.
APRIL 4.—Victorian Branch, B.M.A.: Branch.
APRIL 4.—Western Australian Branch, B.M.A.: Council.
APRIL 5.—South Australian Branch, B.M.A.: Council.
APRIL 6.—Queensland Branch, B.M.A.: Branch.
APRIL 10.—Tasmanian Branch, B.M.A.: Branch.

Medical Appointments.

Dr. Alan Lindsay North (B.M.A.) has been appointed Honorary Visiting Ophthalmic Surgeon to the Lidcombe State Hospital and Home, New South Wales.

* * * *

Dr. Keith Powell Rutherford (B.M.A.) has been appointed Government Medical Officer at Barellan, New South Wales.

* * * *

Dr. R. J. Millard (B.M.A.) has been appointed a Member of the Nurses' Registration Board of New South Wales.

* * * *

Dr. Robert Dick (B.M.A.), Dr. Charles Alfred Hogg (B.M.A.) and Professor John Cadell Windeyer (B.M.A.) have been appointed *ex officio* Members of the Nurses' Registration Board of New South Wales.

* * * *

Dr. Harold D. B. Miller (B.M.A.) has been appointed Certifying Medical Practitioner at Maryborough, Victoria.

* * * *

Dr. Gilbert Elliot Aitken (B.M.A.) has been appointed a Trustee of the New Norfolk Public Cemetery, Tasmania.

Medical Appointments Vacant, etc.

For announcements of medical appointments vacant, assistants, *locum tenentes* sought, etc., see "Advertiser," page xvi..

AUSTIN HOSPITAL FOR CHRONIC DISEASES, HEIDELBERG, VICTORIA: Junior Resident Medical Officer.
HOME AND TERRITORIES DEPARTMENT, CANBERRA: Medical Officer.
MACKAY HOSPITALS BOARD, QUEENSLAND: Resident Medical Superintendent.
REPATRIATION COMMISSION, VICTORIA: Junior Resident Medical Officer.
ST. VINCENT'S HOSPITAL, MELBOURNE: In-patient Gynæcologist, Psychiatrist.
SYDNEY HOSPITALS Clinical Assistant to the Medical Out-Patients' Department.
TASMAN MUNICIPAL COUNCIL: Medical Officer of Health.
THE BRISBANE AND SOUTH COAST HOSPITALS BOARD: Clinical Assistants.
THE WOMEN'S HOSPITAL, CROWN STREET, SYDNEY: Resident Medical Officer.

Medical Appointments: Important Notice.

MEDICAL practitioners are requested not to apply for any appointment referred to in the following table, without having first communicated with the Honorary Secretary of the Branch named in the first column, or with the Medical Secretary of the British Medical Association, Tavistock Square, London, W.C.1.

BRANCH.	APPOINTMENTS.
NEW SOUTH WALES: Honorary Secretary, 30 - 34, Elizabeth Street, Sydney.	Australian Natives' Association. Ashfield and District Friendly Societies' Dispensary. Balmain United Friendly Societies' Dispensary. Friendly Society Lodges at Casino. Leichhardt and Petersham Dispensary. Manchester United Oddfellows' Medical Institute, Elizabeth Street, Sydney. Marrickville United Friendly Societies' Dispensary. North Sydney United Friendly Societies. People's Prudential Benefit Society. Phœnix Mutual Provident Society.
VICTORIAN: Honorary Secretary, Medical Society Hall, East Melbourne.	All Institutes or Medical Dispensaries. Australian Prudential Association Proprietary, Limited. Mutual National Provident Club. National Provident Association. Hospital or other appointments outside Victoria.
QUEENSLAND: Honorary Secretary, B.M.A. Building, Adelaide Street, Brisbane.	Members accepting appointments as medical officers of country hospitals in Queensland are advised to submit a copy of their agreement to the Council before signing. Brisbane United Friendly Society Institute. Stannary Hills Hospital.
SOUTH AUSTRALIAN: Secretary, 207, North Terrace, Adelaide.	All Contract Practice Appointments in South Australia. Booleroo Centre Medical Club.
WESTERN AUSTRALIAN: Honorary Secretary, 65, Saint George's Terrace, Perth.	All Contract Practice Appointments in Western Australia.
NEW ZEALAND (WELLINGTON DIVISION): Honorary Secretary, Wellington.	Friendly Society Lodges, Wellington, New Zealand.

Medical practitioners are requested not to apply for appointments to positions at the Hobart General Hospital, Tasmania, without first having communicated with the Editor of THE MEDICAL JOURNAL OF AUSTRALIA, The Printing House, Seamer Street, Glebe, New South Wales.

Editorial Notices.

MANUSCRIPTS forwarded to the office of this journal cannot under any circumstances be returned. Original articles forwarded for publication are understood to be offered to THE MEDICAL JOURNAL OF AUSTRALIA alone, unless the contrary be stated.

All communications should be addressed to "The Editor," THE MEDICAL JOURNAL OF AUSTRALIA, The Printing House, Seamer Street, Glebe, Sydney. (Telephones: MW 2651-2.)

SUBSCRIPTION RATES.—Medical students and others not receiving THE MEDICAL JOURNAL OF AUSTRALIA in virtue of membership of the Branches of the British Medical Association in the Commonwealth can become subscribers to the journal by applying to the Manager or through the usual agents and booksellers. Subscriptions can commence at the beginning of any quarter and are renewable on December 31. The rates are £2 for Australia and £2 5s. abroad *per annum* payable in advance.